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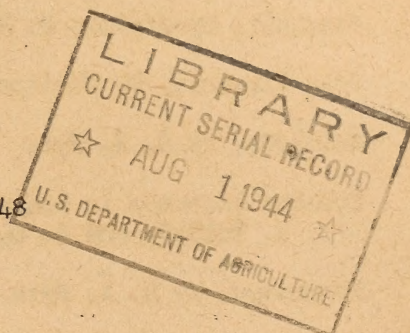
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THE PLANT DISEASE REPORTER

Issued by

THE PLANT DISEASE SURVEY, DIVISION OF MYCOLOGY AND DISEASE SURVEY
BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING
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PLANT DISEASE SURVEYS
IN THE SOUTHEASTERN UNITED STATES IN 1943

June 15, 1944

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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IN THE SOUTHEASTERN UNITED STATES IN 1943

Plant Disease Reporter
 Supplement 148

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EMERGENCY PLANT DISEASE SURVEY IN VIRGINIA

1943

Carlton F. Taylor

Work on the Emergency Plant Disease Prevention Project was started in Virginia in August, 1943. At that time small grains had already been harvested, as had early season vegetables, and only midsummer and autumn crops were available for observation. This report is confined largely to those diseases seen by the writer. The two exceptions are the information drawn from an unpublished report by Dr. G. K. Parris and Mr. H. W. Ridgway on a survey of tomato diseases on the Eastern shore of Virginia, and a report on tobacco diseases in Virginia prepared for the writer by Dr. W. A. Jenkins.

Crop losses reported are estimates, based on counts or the writer's estimate in conjunction with the estimates of pathologists, County Agents, and growers. Percentage losses are reported only where the writer had reason to believe that sufficient information was at hand to make the report reasonably accurate.

The identity of many of the fungi was either determined or confirmed by Dr. Leland Shanor on the basis of material forwarded him by the writer.

VEGETABLE CROPS

ASPARAGUS OFFICINALIS, ASPARAGUS. Cercospora asparagi was abundant on the stems of 70% of the plants in one field.

BRASSICA CAPESTRIS, RUTABAGA. Boron deficiency was found to be causing considerable loss in one locality in western Virginia. In this locality from 500 to 600 acres of rutabagas are produced annually to be marketed in late August and early September. In 1943 approximately 10% (estimate by the dealer and by the County Agricultural Agent) of the acreage suffered from boron deficiency. This represented practically a 10% market loss since no means of removing all affected roots from a lot was known, hence roots from affected fields were not marketed.

BRASSICA OLERACEA var. BOTRYTIS, BROCCOLI. Peronospora parasitica (downy mildew) was observed on most of the older leaves in two fields.

Mosaic was present as a trace in one field.

BRASSICA OLERACEA var. CAPITATA, CABBAGE. Alternaria circinans (A. brassicae) was very prevalent in western Virginia. This infection developed late in the season so that appreciable loss is doubted. It was observed in one field in eastern Virginia. Fusarium oxysporium f. conglutinans (yellows) was of rare occurrence. In one large field approximately 30% of the plants had been affected. Peronospora parasitica (downy mildew) was found on cabbage leaves in several fields but was causing little loss. Xanthomonas campestris (black rot) was found as a trace in one field.

CAPSICUM FRUTESCENS, PEPPER. Pseudomonas solanacearum was suspected to be the cause of death of several plants in one field. Mosaic (virus) was observed in several fields, different sections of one field varying from 2 to 20% of the plants affected.

CUCURBITA PEPO var. CONDENSEA, SUMMER SQUASH. Erysiphe cichoracearum (powdery mildew) was observed as a trace in one field. Pseudoperonospora cubensis (downy mildew) was observed in one field, but appeared to have caused little loss.

DAUCUS CAROTA, CARROT. Alternaria carotae (leaf blight) was observed in many gardens. All specimens examined microscopically yielded this fungus.

IPOMOEA BATATAS, SWEETPOTATO. Actinomyces ipomoeae (pox) was observed occasionally as causing little damage. Fusarium sp. (blue stem) had caused a moderate loss in yield in one field. Stem infection was severe in this field. Monilochaetes infuscans (scurf) had affected at least 15% of the roots in one field and was general in other fields. Phyllosticta batatas (leaf spot) was abundant, but seemed to be causing little damage. Rhizopus nigricans (soft rot) was causing a follow-up rot in many roots affected with blue stem.

LYCOPERSICON ESCULENTUM, TOMATO.

Alternaria solani (early blight) was severe in all early-planted fields, leaf spots having caused from 50 to 90% defoliation when harvest was approximately two-thirds completed. The yield loss probably approached 10%.

Fusarium oxysporium f. lycopersici (wilt) was a major disease in eastern Virginia. Here the Rutgers variety is used widely. However, the frequent occurrence of varietal mixtures made it difficult to correlate the wilt positively with the Rutgers variety.

Phytophthora infestans (late blight) was distributed widely in southwestern Virginia. Both leaves and fruits were affected, though the fruit rot phase was seen more commonly. The highest infection observed was one of 10% of the fruit and 2% of the leaves.

Phytophthora parasitica (buckeye rot) was observed much more rarely than the late blight rot and appeared to have caused little loss.

Sclerotium rolfsii (southern blight) was an important cause of loss in eastern Virginia. Losses ranged from 3 to 80% of the plants (Parris).

Septoria lycopersici (leaf spot) was much less damaging than the Alternaria spot throughout the State.

Mosaic (virus)-infected plants were observed in many fields. In a few fields a high percentage of the plants were infected. In one field both the common tobacco strain and cucumber mosaic were abundant. By October these viruses had spread until most of the plants showed symptoms of both diseases.

Blossom-end rot (non-parasitic) affected possibly 5% of the crop in western Virginia.

PETROSELINUM CRISPUM, PARSLEY

Heterodera marioni (rootknot) had caused about 10% loss in one field of young parsley plants.

PHASEOLUS VULGARIS, BEAN

Bacterial blight (specific type not determined) was observed occasionally, in no case was it observed to be causing measurable loss.

Colletotrichum lindemuthianum (anthracnose) was observed in all portions of the State, but was causing heavy loss in only a few small plantings in western Virginia.

Erysiphe polygoni (powdery mildew) was found as a trace in many fields. In one 6-acre field all leaves and some of the remaining pods were attacked heavily. However, loss was slight as most of the crop had been harvested before the infection became severe. Loss for the state was negligible.

Uromyces phaseoli var. typica (rust) was common in home plantings, usually being more severe on unnamed home grown varieties. It was present as a trace in several commercial plantings.

Rootknot (Heterodera marioni) was of general occurrence, in one field being responsible largely for a yield difference of 50 bushels as compared with 300 bushels per acre in 2 fields on the same farm.

Mosaic (virus) was frequently seen, affecting as high as 5% of the plants in some fields.

SOLANUM MELONGENA, EGGPLANT. Fusarium sp. (wilt) had caused vascular discolorations in 50% of the plants in one field, many of these plants being wilted. Phomopsis vexans (fruit rot) was present on nearly 50% of the fruits in one field in October, the owner estimating a loss of about 25% from this cause during the season.

SOLANUM TUBEROSUM, POTATO. Phytophthora infestans (late blight) was observed as a trace in a very few of the fields observed. The mountainous area in the 5 western counties was not visited. Leaf roll, mosaic, and spindle tuber (virus) were prevalent and causing yield reduction in eastern Virginia. In one field a few plants were seen which showed symptoms typical of yellow dwarf.

SPINACIA OLERACEA, SPINACH. Peronospora effusa (downy mildew) had not developed in eastern Virginia at the end of October. Reports received from this section indicate that in November a moderate infection of this disease had developed.

CEREAL AND FORAGE CROPS

SOJA MAX, SOYBEAN. Alternaria sp., Cercospora sojae, and Phyllosticta glycineum were identified from material collected in a field suffering severely from leaf spots in eastern Virginia. Xanthomonas phaseoli var. sojense (bacterial pustule) was observed on soybeans in all sections of Virginia. In most cases the loss was considered to be slight.

SORGHUM VULGARE, SORGHUM. Helminthosporium turcicum was prevalent in a field in eastern Virginia.

TRITICUM AESTIVUM, WHEAT. Puccinia graminis-tritici (stem rust), on the basis of straw stacks seen and on the reports of growers, was very severe in sections of western Virginia. Yields as low as 5 bushels per acre were reported, allegedly due mostly to the attacks of stem rust.

VIGNA SINENSIS, COMPEA. Amerosporium oeconomicum (leaf spot) was abundant in one field observed in southeastern Virginia.

ZEA MAYS, FIELD CORN. Helminthosporium maydis was identified by Dr. Leland Shanor from leaf lesions collected in southeastern Virginia. Helminthosporium turcicum was identified as the cause of a larger leaf lesion in the same field. The total injury caused by Helminthosporium leaf blight varied considerably with varieties in a hybrid corn trial at Holland. Since, in the records taken in these plots, no attempt was made to distinguish between the 2 types of leaf lesions, it is not possible to determine whether the 2 species had similar varietal reactions.

FRUIT CROPS

AMYGDALUS PERSICA, PEACH. Monilinia fructicola (brown rot) was of extremely rare occurrence. Yellows (virus) was observed as affecting a few trees in northern Virginia. One affected tree was observed near Hansonville in southwestern Virginia. Drought during midsummer tended to reduce the size of the fruit and was an important factor in reducing losses caused by brown rot. Frost during the spring caused complete destruction of the crop in many orchards and was responsible for a very light crop in the State.

MALUS SYLVESTRIS, APPLE. Corticium galactinum (white root rot) was tentatively diagnosed as the cause of death of two trees examined. Erwinia amylovora (fire blight) was much less abundant than during the past few years. Glomerella cingulata (bitter rot) had affected approximately 10% of the Grimes Golden apples in a close-planted, poorly-sprayed block. It was seen in no other orchard. Gymnosporangium juniperi-virginianae (rust) was observed in many apple orchards. It ranged from slight to severe leaf infections, in a few instances having caused sufficient defoliation to have reduced the fruit size. Physalospora obtusa (black rot) was observed as a trace in a few orchards. Venturia inaequalis (scab) caused a considerable loss in unsprayed or poorly-sprayed orchards, but was unimportant in well-sprayed orchards. Xylaria mali (black root rot) was found to be killing trees in 4 of 6 3-to 13-year orchards examined in Clark and Frederick Counties. A total of 16 trees of approximately 5260 had been killed by this disease. In older orchards, in which no accurate check was made, a number of trees were killed by this organism.

PRUNUS CERASUS, CHERRY, SOUR. Coccomyces hiemalis (leaf spot) developed rapidly during June, but the following drought checked the epiphytotic, loss being less than in recent years. Dibotryon morbosum (black knot) was observed as severely damaging one small tree in a home garden in Washington County. Monilinia fructicola (brown rot) was of little importance in 1943.

VITIS SP., GRAPE. Cercospora viticola was found in abundance in one location in western Virginia. Guignardia bidwellii (black rot) was very destructive throughout the State.

SPECIAL CROPS

ARACHIS HYPOGAEA, PEANUT.

Mycosphaerella arachidicola was the cause of the leaf spot collected in August, while M. berkeleyi was the most abundant species on collections in the same areas in October. In the opinion of those familiar with the problem, infection and loss was somewhat less than in recent seasons.

Sclerotium rolfsii (southern blight) killed few entire plants in most fields, the number being less than 5% in any field seen. However, in some fields, which at first glance showed little death of plants, many plants were found to have one or two dead stems.

In company with Dr. S. A. Wingard, 3 days were spent in examining peanuts at harvest time. Mr. E. T. Batten, Superintendent of the Holland

Station, estimated that approximately 30% of the peanuts of proper maturity in that section were rotted, the rot ranging from 5 to 50% in different fields. Accurate counts were difficult because of the tendency of the rotted nuts to be lost in digging. The incidence of rot was correlated with crop rotation, being more extensive where peanuts followed peanuts than in fields not recently planted to peanuts or to other susceptible crops. In general, rot was more severe on plants of which some stems had been killed than on plants that showed no wilt.

At the Holland Experiment Station adjacent plots of peanuts following peanuts and peanuts following soybeans were examined. Immediately after digging (mechanical) the pods from 4 consecutive plants in each plot were opened and the condition of the nuts recorded. While these counts are of limited extent, the plants examined appeared representative of the plots. The data are presented in Table 1.

Table 1. Effect of rotation on rot of peanuts.

	Peanuts following			
	Peanuts		Soybeans	
	Attached to vine	Loose* in soil	Attached to vine	Loose in soil
Pods very immature	8	-	10	3
Pods sl. immature, probably usable	15	2	29	2
Pods mature, nuts sound	5	1	36	1
Pods over-mature, nuts sound	1	14	7	1
Mature to over-mature, nuts rotted:				
<u>Sclerotium rolfsii</u>	13	14	17	8
shrivelled, prob. <u>Sc. rolfsii</u>	13	12	2	7
miscellaneous rots	4	1	3	1
Harvested crop:				
sound	21	(17) (38)	72	(4) (76)
rotted	30	(27) (57)	22	(16) (38)

* Pods lost in normal digging operations

The rot of peanut pods was due principally to Sclerotium rolfsii. Of the several samples collected from various fields, microscopical examination by Dr. Wingard revealed that a low percentage of the pods contained fruiting structures of Thielavia, Penicillium, Rhizopus, and other fungi.

GOSSYPIMUM, COTTON. Alternaria gossypina (leaf spot) was very abundant. Fusarium moniliforme (boll rot) was present on less than 1% of the bolls in one field. Xanthomonas malvacearum (angular leaf spot) was abundant.

NICOTIANA TABACUM, TOBACCO

This section has been abbreviated from a report prepared for the writer by Dr. W. A. Jenkins of the Tobacco Experiment Station at Chatham.

Peronospora tabacina (downy mildew) caused individual plant bed losses ranging from negligible to 90%; average losses ranging between 25 and 40%.

The sustained epiphytotic contributed to the late planting of at least 1/3 of the tobacco acreage in Virginia and to severe losses later in the season (PDR 27:298, 1943).

Phytophthora parasitica var. nicotianae (black shank) was seen on several farms in Pittsylvania, Halifax, Charlotte, Franklin, and Mecklenburg Counties from which there had been no reports of the disease in previous seasons. In only a few instances did the infestations appear to have been of recent origin.

Pseudomonas solanacearum (Granville Wilt) continued to spread locally in both the bright and dark fire-cured belts. Losses ranged from a few plants to as high as 70% of the plants in some fields.

Rhizoctonia solani (sore shin) was general throughout the bright tobacco belt. In most cases the total loss was negligible. In Patrick County severe losses were reported locally.

Sclerotium rolfsii (southern blight) was seen in only a field or two in Pittsylvania County.

Thielaviopsis basicola (black root rot) was observed fairly generally throughout the area. Owing to the late season and the use of resistant varieties in the bright tobacco belt, the disease caused little noticeable damage except locally.

Heterodera marioni (rootknot) was present and appeared to be spreading slowly in certain sections of Pittsylvania, Halifax, and Dinwiddie Counties.

Brown root rot (cause undetermined) was found on 2 farms in Halifax County.

Mosaic (virus) was general throughout the tobacco area, field infections ranging from 10 to 90%.

Ring spot (virus) was scattered, though on the increase in the bright tobacco belt. Losses probably were insignificant.

"Ruffle leaf" (probably genetic anomaly) was found in a single field in Franklin County during the season. Essentially every plant in this field was affected and the crop was rendered unfit for harvest.

MISCELLANEOUS CROPS

IPOMOEA HEDERACEA Albugo ipomoeae-panduranae (white rust) was abundant in immediate proximity to sweetpotato fields.

IPOMOEA PURPUREA, WILD MORNING GLORY. Albugo ipomoeae-panduranae (white rust) was abundant in immediate proximity to sweetpotato fields. Coleosporium ipomoeae (rust) was observed frequently. Cercospora viridula (leaf spot) was collected in western Virginia.

PINUS STROBUS, WHITE PINE. Chlorotic dwarf (cause unknown) was diagnosed tentatively as the cause of chlorosis and dwarfing of a few transplanted white pines in gardens in Blacksburg.

Needle blight (probably nonparasitic) affected many white pines in Floyd and Montgomery Counties. Early in the season this injury was diagnosed by Dr. S. A. Wingard as being caused by the death of feeding roots due to excessively high soil moistures. A similar trouble is described in more detail in the summary for West Virginia.

PRUNUS SEROTINA, WILD BLACK CHERRY. Phyllosticta prunicola (leaf spot) was abundant in two locations in eastern Virginia. Tranzschelia prunispinosae (rust) was abundant at one location in eastern Virginia.

EMERGENCY PLANT DISEASE SURVEY IN WEST VIRGINIA IN 1943

Carlton F. Taylor

Work on the Emergency Plant Disease Prevention Project was started in West Virginia July 27, 1943. While many crops had been harvested at that time, the writer had been in a position to observe diseases in portions of the State during the early season. During the remainder of the season an attempt was made to visit each crop region at least once at a time suitable for examination of the most common crops grown.

Data on cereal crop diseases were obtained from Mr. William Watson, in charge of the Barberry Eradication program in West Virginia; the source of such data are indicated in the text. Members of the Department of Plant Pathology made available other data on crop loss.

Following are the observations on plant diseases in West Virginia in 1943:

VEGETABLES

BETA VULGARIS, BEET. Cercospora beticola (leaf spot) was prevalent throughout the State but appeared to cause little loss. Nematode (unidentified) was the probable cause of galls on a specimen submitted to the Experiment Station for diagnosis.

BETA VULGARIS var. CICLA, SWISS CHARD. Cercospora beticola (leaf spot) caused the discard of more than 50% of the leaves in many plantings.

BRASSICA OLERACEA var. CAPITATA, CABBAGE. Fusarium oxysporum f. conglutinans (yellows) was observed on few plants. The use of wilt-resistant varieties is general in West Virginia. Plasmidiophora brassicae (club root) was found in one garden in Morgantown.

BRASSICA RAPA, TURNIP. Phyllosticta tabifica (leaf spot) was abundant in gardens in two sections of the State.

CUCULIS SATIVUS, CUCUMBER. Colletotrichum lagenarium (anthracnose) killed the vines in a greenhouse planting; this developed after a normal crop had been harvested, so probably caused little loss. Many garden plantings in Monongalia County were killed by this disease.

DAUCUS CAROTA, CARROT. Alternaria carotae (leaf blight) was widely distributed. A reduction in yield of 5% is estimated.

LYCOPERSICON ESCULENTUM, TOMATO. Alternaria solani (early blight) was general throughout West Virginia. It was estimated that 40% of all tomato foliage in the State was killed by this disease. Many fields were defoliated in early stages of production.

Cladosporium fulvum (leaf mold) was found in two locations in gardens with very poor air drainage. Where observed the percentage of infection was high. It is assumed that some loss in yield was incurred.

Fusarium oxysporum f. lycopersici (wilt) caused extensive loss in plantings of non-resistant varieties, mostly in novelty-type varieties.

Phytophthora infestans (late blight) was of major importance in the mountainous districts. In some plantings all of the leaves had been killed and 2/3 of the fruit had rotted by early September. In Pocahontas County

it was estimated that a crop loss of 25% was caused by late blight. It is estimated that the loss for the State was not more than 2%.

Phytophthora parasitica (buckeye rot) was much less abundant than late blight. In adjacent Victory gardens with unstaked plants of the same variety and age, heavily straw-mulched vines had no rotted fruits in September, while unmulched plants had 44% of the fruits rotted by this organism.

Septoria lycopersici (leaf spot) was found frequently but caused severe loss in few fields. Over the entire State it caused not more than 1/5 as much leaf destruction as did Alternaria.

Nematode (probably Heterodera marioni) was observed to be severely affecting all tomato plants in a garden in Logan.

Mosaic (virus) was rare in most plantings. In one planting of 1000 plants all plants were affected severely and production was negligible. In garden plantings the incidence of mosaic varied from 0 to 25%. In one greenhouse mosaic apparently was contracted from adjacent petunias, necessitating the discard of a lot of experimental plants. The loss for the State due to mosaic probably was not more than 1%.

Tip blight (virus) was present in the greenhouse where discovered in 1942, but in very much reduced amounts. A clean-up campaign was responsible for this reduction.

Blossom end rot (non-parasitic) caused severe losses in the drought-affected commercial areas in the eastern part of the State. Counts of affected fruits ranged as high as 62%. The loss for that section was estimated at from 15 to 20%. A state-wide loss of 10% was estimated.

Lightning killed all of the plants in a small area in one field.

PHASEOLUS LUNATUS, LIMA BEAN. Bacterial blights were observed in several plantings, but appeared to have caused little damage.

Phytophthora phaseoli (downy mildew) was present on approximately 15% of the pods in one semi-commercial garden in mid-September. Mosaic symptoms were present on 5% of the plants in a commercial field.

PHASEOLUS VULGARIS, BEAN. Colletotrichum lindemuthianum (anthracnose) was not found in most of the gardens examined. In a few gardens the loss approached 100%. In most cases it appeared that the source of inoculum lay in rows planted to home-grown seed.

Fusarium sp. (root rot) killed as high as 20% of the plants in several gardens in the vicinity of Morgantown. No observations were made on the prevalence of this disease throughout the State.

Pseudomonas medicaginis var. phaseolicola and Xanthomonas phaseoli (bacterial blights) rarely were observed to have caused appreciable loss and in most cases could be traced to the use of home-grown seed. In one large garden all of the leaves and 5% of the pods were infected on September 8.

Uromyces phaseoli var. typica (rust) was observed in several localities, but had caused appreciable defoliation in only one or two cases.

SOLANUM TUBEROSUM, POTATO. Actinomyces scabies (scab) appeared more prevalent than in past seasons. Several cases of very severe loss (more than 50% of the market value of the crop) were encountered. This appeared to be due in part to a brief dry period at the time of tuber formation in these fields and, in part, to injudicious application of lime.

Alternaria solani (early blight) was prevalent on early maturing varieties in the lower portions of the State. In the mountainous regions it was less damaging because, if the potatoes were not protected by sprays, late blight killed the foliage in advance of the early blight. A loss of 6% for the State was estimated.

Corynebacterium sepedonicum (ring rot) was observed in several lots of harvested tubers.

Erwinia carotovora (bacterial soft rot) was the probable cause of the loss of as many as 5% of the tubers in several fields. Usually this disease was correlated with excessive injury from the wheels of the potato spray machinery.

Pellicularia filamentosa (Corticium solani) (rhizoctonosis) was not studied in relation to sprout injury in the spring. Sclerotia were observed on the tubers in a few fields, 37% of the tubers affected being the most severe infestation noted. In this field 4% of the tubers were pitted, these pits resembling those typical of insect injuries followed by Rhizoctonia.

Phytophthora infestans (late blight) caused reductions in yield of more than 50% in unsprayed or poorly sprayed fields. Most of the loss was due to reduced tuber size due to foliage loss. Tuber rot was slight owing to the very dry weather preceding and during the harvest period. The total loss in yield for the State was estimated at 17%. During early August at the height of the epiphytotic, unsprayed fields were observed to have progressed from one or two focal points of infection to destruction of 80% of the foliage in from 8 to 10 days.

Pythium sp. was suspected of being the cause of "leak" observed in many fields at harvest time. The maximum infection noted was not more than 2 or 3%, the loss for the State being negligible.

Spondyloccladus atrovirens (silver scurf) was observed on the tubers from many fields. Infection was slight and it is believed that this disease caused no reduction in market value.

Bluestem (virus) was less severe than in 1940 and 1941. A loss of 3% was estimated.

Spindle tuber (virus) symptoms were observed in several lots of harvested tubers, in one lot approximately 10% being affected.

Virus diseases such as mosaic, leaf roll, and others were observed in many fields. During the season of this survey the plants had passed the optimum period for the diagnosis of such diseases.

Hopper burn (leaf hopper) caused heavy loss in production in the same areas affected by early blight. A loss of yield of 6% for the State was estimated.

CEREALS, GRASSES, AND FORAGE CROPS

AVENA SATIVA, OAT. Puccinia coronata (crown rust) caused an estimated loss in yield of 2% (Watson). Puccinia graminis var. avenae (stem rust) was estimated as causing a loss of 0.5%.

Ustilago avenae (loose smut). Data were taken by the writer on plots from 32 samples of oats taken from farmers' grain drills and planted at an experiment station. The smut counts showed a range of from 0 to 18%,

averaging 3.98%. Only one sample yielded a positive test for the presence of a seed treatment. It is believed that these data are representative of the State.

HORDEUM VULGARE, BARLEY. Gibberella zeae (scab) was reported as a 4% loss, approximately half as destructive as in 1942. Puccinia anomala (leaf rust) was reported as a loss of 1% (Watson). Puccinia graminis var. tritici (stem rust) was reported as a trace (Watson). Ustilago sp. (loose smut) was estimated to have caused a loss of 3%.

POA PRATENSIS, BLUE GRASS. Ustilago striaeformis (smut) on the basis of information made available by J. G. Leach and others, affected as high as 25% of the plants in some pastures.

SECALE CEREALE, RYE. Claviceps purpurea (ergot) was observed in a few fields.

SOJA MAX, SCYBEAN. Xanthomonas phaseoli var. sojense (bacterial pustule) was observed in most sections of the State, but in no case did it appear to be causing appreciable damage.

SORGHUM VULGARE, SORGHUM, CANE. Puccinia purpurea was found on the leaves in one planting.

TRITICUM AESTIVUM, WHEAT. Gibberella zeae (scab) was less severe than in 1942 but was estimated as causing a loss of about 4%. Puccinia graminis var. tritici (stem rust) was prevalent in the southeastern part of the State where the native barberry is abundant. The loss due to this disease in West Virginia in 1943 was estimated at between 10 and 15% (Watson). Puccinia rubigo-vera var. tritici (leaf rust) was estimated as causing a loss of approximately 1% (Watson). Ustilago tritici (loose smut) was estimated as causing a loss of 3%.

ZEА MAYS, FIELD CORN. Helminthosporium turcicum (leaf blight) was observed to be causing severe leaf injury in but 4 of all corn fields within view of the roads travelled in the course of this survey. This disease was very much less severe than in 1942. Ustilago maydis (U. zeae) (smut) was present in most of the fields, but usually affected a low percentage of the ears.

FRUIT

AMYGDALUS COMMUNIS, ALMOND. One tree in Brook County, the only almond tree observed, showed advanced symptoms of yellows (virus).

AMYGDALUS PERSICA, PEACH. Monilinia fructicola (Brown rot) caused minor loss, probably due to dry weather at harvest time. Virus yellows is widespread on non-commercial plantings, an estimated 20% of such trees being affected. In commercial orchards the loss was much less than 1% of the trees. Frost killing of the buds reduced the crop by at least 50%.

AMYGDALUS PERSICA var. NECTARINA (NECTARINE). One tree in Jefferson County showed symptoms of yellows (virus). This was the only nectarine tree seen.

MALUS SYLVESTRIS, APPLE. Armillaria mellea was considered responsible for the death of 4 of 245 dead trees in the 3- to 14-year age class. Erwinia amylovora (fire blight) was much less severe than in recent years.

Gloeodes pomigena (sooty blotch) was abundant on fruit from unsprayed orchards.

Glomerella cingulata (bitter rot) was rarely seen in the drought-affected eastern portion of the State. In the Chic Valley one count of 60% infected fruit was obtained; many trees reached 20% infected fruit. These were isolated cases and the loss for the State as a whole was negligible.

Gymnosporangium juniperi-virginianae (cedar-apple rust) was more prevalent than during recent years. Leaf infections caused a considerable amount of premature defoliation in some orchards, in a few cases this condition being aggravated by spray injury initiated in the rust lesions. In one Rome Beauty orchard 20% of the fruit was reduced in grade from U.S. No. 1 to No. 1 Canner, a few with very deep lesions being graded as cider apples. Little fruit infection was seen in most orchards.

Helmintosporium peculosum (black pox) was found in unsprayed orchards. Illosporium malifoliorum (leaf spot) was observed in abundance in an unsprayed orchard.

Leptothyrium pomi (fly speck) was abundant on fruit from unsprayed orchards.

Mycosphaerella pomi (fruit spot) was found rarely.

Pyrenopeziza solitaria (blotch) was rarely found in the dry eastern portion of the State. Where rainfall was more abundant it was found on susceptible varieties. Eighty per cent of the fruit were infected on one Gano tree in the Ohio Valley.

Phyosalospora obtusa caused very little loss in sprayed orchards.

Phytophthora cactorum (crown rot) was tentatively diagnosed as the cause of death of more than 1000 5- to 10-year-old trees. It was first called to the attention of Dr. A. B. Groves of the Winchester Research Laboratory by a grower who lost more than 500 trees from this disease.

Venturia inaequalis (scab) was much more prevalent than during recent seasons. The loss was more severe in the western than in the eastern portion of the State; many poorly sprayed orchards being defoliated by mid-summer due to scab. The loss due to scab was estimated at 16.4% (12% yield and 4.4% quality).

Xylaria mali (black root rot) appeared to be more prevalent than during recent years. This was assumed to be an effect of drought, less loss of root system being tolerated than in normal years. It is probable that a tendency to visit orchards where tree loss had been reported in those cases where prior information was available provided an upward bias in the estimates of tree loss for the area.

Bitter pit (non-parasitic) was present in many orchards, occasionally causing severe loss. The loss for the State probably was lower than 1%.

Internal bark necrosis (non-parasitic) was found occasionally, but was of minor importance.

Frost injury on the night of May 1 reduced the crop by about 40% in the eastern part of the State and by approximately 80% in the remainder of the State.

PRUNUS spp., CHERRY, SOUR AND SWEET. Coccomyces hiemalis (leaf spot) was much less severe than in recent years in the dry eastern portion of the State. Here unsprayed orchards were only partially defoliated at the end of the season in contrast to recent years when unsprayed trees were defoliated in mid-August. Leaf spot was severe in other portions of the State. Monilinia fructicola (brown rot) was of minor importance in 1943.

RUBUS sp., RASPBERRY. Elsinoë veneta (anthracnose) was found on specimens submitted to the Experiment Station by a County Agricultural Agent. Mosaic (virus) was seen frequently but no data were collected on its prevalence.

VITIS sp., GRAPE. Guignardia bidwellii (black rot) probably caused the destruction of well over 50% of this fruit in 1943. Losses of 80% were common in unsprayed plantings. Plasmopora viticola (downy mildew) infected 100% of the leaves in many plantings and, in some cases, caused a 50% defoliation by late September. Yield loss was slight since most of the grapes in these plantings had been destroyed by black rot. Uncinula necator (powdery mildew) was present on many of the leaves in one vineyard.

TREES

PINUS STROBUS, WHITE PINE. Needle blight (probably non-parasitic). In June of 1942 the writer had occasion to examine a few hundred acres of white pine forest (natural stand) in which a die-back of needles was prevalent. The symptoms agreed closely with those later described by Spaulding and Hansbrough (Spaulding, Perley, and Hansbrough, J. R. The needle blight of eastern white pine. Mimeographed report issued by the Division of Forest Pathology, February, 1943. Two pages). Needle tips were a reddish-brown and the affected parts appeared to be dead. At that time it was suggested that this was a drought effect. With the advent of heavy rains new growth developed, these new needles remaining in excellent condition throughout 1943. The needles affected in 1942 dropped during the winter of 1942-43.

In 1943, during an excessively wet spring, similar foliar symptoms developed. In West Virginia affected pines were observed in most sections where the white pine occurs naturally. On most trees all needles were affected severely, on other trees the injury was confined to the leaf tips on portions of the tree. During the period from mid-July to late October no noticeable change occurred in the appearance of the affected trees. A similar injury in Virginia was noted by Dr. S. A. Wingard of the Virginia Agricultural Experiment Station and diagnosed as being caused by the destruction of rootlets in saturated soil moistures. Large numbers of pines were affected in eastern West Virginia. No data are available as yet on the survival of trees affected in 1943.

Chlorotic dwarf (cause unknown) was diagnosed by May and Swinge of the Division of Forest Pathology as the cause of stunting of white pines in two plantings in West Virginia.

QUERCUS ALBA, (WHITE OAK). Many mature white oak trees were killed by an unidentified trouble in southern West Virginia in 1943. Beyond the fact that the two-lined chestnut borer was present in the affected trees, no diagnostic data were obtained in a brief survey. Arrangements were made to revisit the area in 1944 in company with forest pathologists if the 'disease' reappears.

KENTUCKY PLANT DISEASE SURVEY, 1943

R. A. Hyre

The following is a summary of surveys made in September. Credit is due Dr. Valleau and his staff for assistance in identification of specimens.

VEGETABLE CROPS

IPOMOEA BATATAS, SWEETPOTATO

Twenty-two fields were examined carefully, centering around Graves County in western Kentucky and Jefferson County (Louisville) in north-central Kentucky. The fields varied from 1 to 5 acres in size with one 10-acre field included. The variety was largely Nancy Hall.

(Fusarium oxysporum f. batatas (F. batatatis and F. hyperoxysporum) stem rot, was virtually the only disease encountered. The loss varied from about 20% in lower western Kentucky to about 10% around Louisville. One field each at Lexington and Hopkinsville was free from stem rot while about 5% was present in one field each in McCracken, Todd, and Warren Counties. In 2 fields examined the Porto Rico variety had from 1/3 to 1/5 as much stem rot as Nancy Halls in the same fields. In 2 acres of Maryland Golden a trace of stem rot was found while adjacent Nancy Halls had 10%.

Endoconidiophora (Ceratostomella) imbricata, black rot. Harvested potatoes were seen on only one farm in Jefferson County, and a trace of black rot was present there.

Mosaic (virus) was seen only in Todd County where 0.5% occurred in 1-1/2 acres.

LYCOPERSICON ESCULENTUM, TOMATO.

Eleven fields, averaging 3 to 4 acres each, were examined in the western half of the State. Severe drought conditions injured the crop.

Alternaria solani, early blight, owing to dry weather, was unimportant except in the single field examined in Warren County which was 50% defoliated.

Bacillus sp., soft rot was of little importance except in some cases where it followed and destroyed fruit already damaged by sun scald.

Fusarium bulbigenum f. lycopersici, wilt, was found in 3 of the 11 fields. 11% in 8 acres in Christian County, 35% in one acre in Graves County, and a trace in one field in Fayette County.

Colletotrichum phomoides, anthracnose, was found only in the 2 fields surveyed near Lexington (Fayette County) but caused little loss.

Sun scald. The tomato plants were not staked and with sparse foliage resulting from the drought sun scald of the fruit was almost universally present and severe. For example, the crop on 7 acres in Hancock County was almost a total loss from sun scald since the farmer could not afford to hire the tomatoes picked and haul them to the factory because of the low (half) price offered by the cannery.

CEREAL CROPS

SORGHUM VULGARE, SORGHUM

Cercospora sorghi (?). A purple leaf spot was very general in and around Harlan County.

ZEA MAYS, MAIZE (INDIAN CORN)

Twenty fields of corn were examined, covering the State. A severe drought in the western part of the State curtailed the survey.

Bacterium stewartii, bacterial wilt. The late infection, or bacterial leaf blight, was found in all fields examined, varying from 15 to 85% of the plants affected. The actual leaf area killed generally was estimated to be about 5 to 10%, occasionally reaching as much as 20 to 25% from all leaf diseases of which bacterial wilt was dominant in all areas except around Harlan and Letcher Counties in eastern Kentucky, and was frequently the sole leaf disease present in western Kentucky.

Cercospora zeae-maydis, leaf spot, was the dominant leaf disease in Harlan and Letcher Counties. This disease was not known to occur in Kentucky prior to this survey.

Fusarium moniliforme, ear rot, was frequently found following ear worm injury but the damage was slight. So few ear rots of any kind were found that the survey was discontinued.

Helminthosporium spp. were found most frequently in the eastern part of the state but were much less abundant than bacterial leaf blight.

Puccinia sorghi, rust, was recorded to the extent of 3% of plants affected in just one field.

Ustilago maydis (U. zeae), smut, was found to the extent of 3% of plants affected in just 2 fields.

Firing. A firing and drought injury of the leaves was so abundant in western Kentucky that it rendered the surveying of leaf diseases difficult.

FRUIT CROPS

AMYGDALUS PERSICA, PEACH

Three orchards were examined. The crop was almost eliminated by spring freezes.

Xanthomonas pruni, bacterial spot. In a McCracken County orchard bacterial leaf spot was general but not severe.

Spray injury. In a Livingston County orchard marginal spray injury of the Red Bird variety was severe.

MALUS SYLVESTRIS, APPLE

Fifteen orchards were visited. Many of them were along the Ohio River. A late spring freeze misled many growers as to their probable crop and, as a result, the spraying suffered.

Considerable information was obtained from Mr. W. D. Armstrong, Horticulturist, Western Kentucky Experiment Station, Princeton.

Gloeodes pomigena, sooty blotch. The presence of sooty blotch in 4 small and one large orchard indicated the omission of some sprays.

Glomerella cingulata, bitter rot, was present in 13 of the 15 orchards visited, being severe in 5 of them. In a Henderson County orchard a copper spray was not applied until bitter rot was already present and then it "kept on coming". This year diseases, particularly bitter rot, have been a major factor in fruit production of the Grimes Golden and Golden Delicious varieties. The variety King David has nearly been eliminated in Kentucky by bitter rot.

Gymnosporangium clavipes, quince rust, was causing concern and was generally present, but not in great abundance.

Leptothyrium pomi, fly speck, was found in the same 4 small orchards and one large orchard in which sooty blotch was found.

Phyllosticta solitaria, blotch, was severe in one orchard each in Christian, Webster, and Henderson Counties and was present in Warren County. It was seen in a severe form on the variety Arkansas Black, was general on Grimes Golden, occurred on Kentucky Winesap, Mammoth Black Twig, and Stayman, and was present on Golden Delicious.

Phylospora obtusa, black rot, frog-eye. Black rot of the fruit was found from traces to considerable amounts in 9 of the 15 orchards. The frog-eye leaf spot caused considerable damage.

Venturia inaequalis, scab, was present in 13 of the 15 orchards surveyed, and was severe on some varieties in 5 of them. In general it was a bad scab year in Kentucky, but the disease was fairly well controlled in well-sprayed orchards. In other orchards scab and codling moth did not leave "enough apples for the second brood of codling moth".

Arsenical injury of the calyx end was the main problem in one Henderson County orchard.

SPECIAL CROPS

CANNABIS SATIVA; HEMP. Numerous fields observed from the car and a few entered, but no diseases were noted. The stands were very irregular.

NICOTIANA TABACUM, TOBACCO. A summary of diseases on this crop, furnished by W. D. Valleau and E. M. Johnson, follows:

TOBACCO DISEASES IN KENTUCKY, 1943

W. D. Valleau and E. M. Johnson¹

The plant bed season of 1943 was unusually wet. The worst outbreak of wildfire [Pseudomonas tabaci] occurred in Central Kentucky in at least the past 25 years, emphasizing the importance of protracted wet weather in initiating an outbreak of this disease which has been comparatively rare in Central Kentucky. Wildfire was found in approximately 50% of untreated plant beds examined in Fayette and surrounding counties. The severe outbreak of wildfire and angular leafspot [Pseudomonas angularata] tested the value of the bordeaux treatment in preventing the diseases.

¹ Kentucky Agricultural Experiment Station

Where applied early enough (before outbreak of the disease) bordeaux usually gave complete control throughout the plant bed season. An occasional instance was seen where a few plants in a small spot in a treated bed were infected, evidently in a spot missed in sprinkling. About 10% of the beds were treated early enough to prevent infection and much treating was done after infection appeared. Although plant bed infection was heavy, practically no wildfire or angular leafspot has been seen or reported to us this summer except in areas of fairly high rainfall several fields set from wildfire-infested beds appeared to be badly injured early in the season.

Blue mold [downy mildew, Peronospora tabacina] was reported twice in Central Kentucky (June 3 and 8) and from nowhere else in the State, although it is probable that there was a light infection in other places.

At setting time there were 2 hot periods. On June 4, 5, and 6 temperatures reached 92, 91 and 95° F; and on June 12, 13, 14, 15, and 16, maximums were 95, 96, 92, and 91° F. Stalks set June 4 were scalded, if the plants were shanky, and most leaves were killed. By June 7 the plants looked as though they might live although only the stalk and smallest leaves remained. Tobacco reset that day, when the maximum temperature was 88° F lived and grew rapidly; but rows not reset in the same plot continued to die for several days; and plants surviving in these rows grew slowly as compared with reset plants. In numerous fields throughout the State that were set during or within 2 or 3 days prior to the hot periods stands were poor and were not reset because plant died so gradually. Various reasons, such as drouth and wire worms, were given for poor stands, but there seems to be no doubt that the primary cause was the heat.

A drouth occurred over much of the State during July and August. Under these conditions mosaic [virus] spread very slowly and suckers after cutting showed unusually little mosaic. Kentucky 52 (NN) mosaic-resistant burley, where used by farmers who have been troubled with mosaic, has given perfect control. Kentucky 52 was of very high quality when cured.

Steak [virus] usually develops in burley tobacco in several counties northwest, north, and northeast of Fayette County in July. This year there was practically no streak during the drouth in July or August, but tobacco still standing the second week in September following rain developed an average of about 40% streak in 14 fields examined in Owen County. Fields along roadsides or waste places where sweetclover was growing showed heavy infection (up to 100%); while fields surrounded by closely cropped pastures or cultivated land were nearly free. It seems probable that infection occurred during July and August when second year sweetclover died and insects left it, but because of slow growth virus movement did not occur until after September rains when translocation of food materials and virus would be expected to be accelerated.

Black shank [Phytophthora parasitica var. nicotianae] was found in Woodford, Carroll, and Bath Counties and in a new location in Scott County higher up the Elkhorn Creek than previous outbreaks. In Bath County heavy infection was found for more than a mile along Slate Creek. Some was noticed in the creek bottom the previous year following a flood that covered some of the plantings with water soon after setting. The trouble was believed at that time to be drowning. In 1942 infection was carried to a

planting on a steep hillside about 300 yards up a draw from Slate Creek. This field was heavily infected again in 1943, and a planting on still higher ground in newly plowed land set immediately after the hillside plot was also heavily infected.

Fusarium wilt [Fusarium oxysporum f. nicotianae] seems to be on the increase; at least we are receiving many more reports of it than in the past. Kentucky 33 burley is being successfully used in infested areas; an occasional plant shows signs of infection but usually recovers. Wilt was reported in Simpson County to be causing serious loss in fields of One-Sucker dark tobacco.

Specimens of bacterial black stalk (Ky. Bul. 437) were received from Marion, Fayette, Bath, Mason and Lewis Counties.

Potash starvation was prevalent in Burley tobacco. In spite of almost ideal curing conditions following cutting, potash-starved tobacco appeared to be curing poorly. Upper leaves were harsh, lifeless and very dark brown.

Two cases of leaf spotting caused by phosphorus deficiency were observed, in one instance following a crop of vetch and rye turned under. In early August the older leaves of the small plants showed scattered necrotic spots. The leaves had a very low phosphorus content and the addition in the spring of superphosphate to a part of the field had a marked effect on growth.

TENNESSEE PLANT DISEASE SURVEY, 1943

R. A. Hyre

Following is a summary of surveys made in August, September, and October. Dr. C. D. Sherbakoff gave much assistance in diagnosing and verifying specimens.

Western Tennessee suffered a severe drought this summer. Dodder (Cuscuta sp.) was observed in many counties, often to a considerable extent. It was especially common on the annual lespedeza.

VEGETABLE DISEASES

CAPSICUM FRUTESCENS, PEPPER

Two 1-acre fields were observed in western Tennessee. Sclerotium rolfsii, southern blight, caused a 20% loss in one acre in Gibson County. Sun scald caused 25 to 30% loss in one acre in Shelby County.

CUCUMIS SATIVUS, CUCUMBER

Colletotrichum lagenarium, anthracnose, was generally present in the only field observed in Madison County.

IPOMOEA BATATAS, SWEETPOTATO.

In addition to surveying sweetpotatoes in the field the records of the state inspectors on sweetpotatoes entered for certification were obtained from Professor G. M. Bentley, State Entomologist and Plant Pathologist, to whom the writer is indebted.

*CITRULLUS VULGARIS, WATERMELON. Only one field of any size was observed.

Colletotrichum lagenarium, anthracnose caused loss estimated by the grower at 85% loss (\$1,500.) in one field of Stone Mountain. Fusarium oxysporum f. niveum, wilt, is known to be important locally throughout the State.

Fusarium oxysporum f. batatas (F. batatatis and F. hyperoxysporum) stem rot. In 6 fields surveyed in the large sweetpotato area of western Tennessee the amount of stem rot varied from a trace to 50% in the Nancy Hall variety. The Porto Rico variety usually contained considerably less. Mr. Hazlewood, Superintendent of the Western Tennessee Agricultural Experiment Station, stated that stem rot will cause 20 to 25% loss year in and year out in western Tennessee. Considerably less was found in 11 fields examined in central and eastern Tennessee.

In the certification program 0.1% stem rot disqualifies. Because of stem rot sweetpotatoes of the Nancy Hall variety were not entered for certification in Gibson, Henry, and Weakley Counties in western Tennessee. Of 86 acres of Porto Ricos in 29 fields entered for certification 63% were condemned. In central Tennessee 6% of 40 acres of Porto Ricos and 26% of 137 acres of Nancy Halls in 63 fields were condemned. In eastern Tennessee none of 6 acres of Porto Ricos and 21% of 71 acres of Nancy Halls in 40 fields were condemned.

Heterodera marioni, root knot, in the form of 1 or 2 mm. holes on the surface with disfiguration extending into the roots, is becoming more important in eastern Tennessee and is seen on many of the roots marketed. By peeling, after cooking, and weighing 47 pounds of sweetpotatoes, with and without nematode injury, a loss of 11% was ascribed to nematode injury with 35 to 100 nematode scars per 1/2-pound root.

Endoconidiophora (Ceratostomella) fimbriata, black rot. In the first field inspection of 71 acres, mostly Nancy Halls, in eastern Tennessee 14 plants with black rot were found. A trace of black rot on a few early harvested sweetpotatoes was found in western Tennessee. A large grower there stated that black rot was no longer a problem with the commercial growers in that area.

Mosaic (virus). Only a trace (65 plants in 71 acres) of mosaic was found in eastern Tennessee.

LYCOPERSICON ESCULENTUM, TOMATO

Twenty-eight fields were surveyed in 19 counties representing all parts of the State.

Alternaria solani, early blight, in eastern Tennessee was very general and resulted in up to 50% defoliation of the plants by mid-harvest season. It was progressively less prevalent toward central Tennessee, and in western Tennessee it was virtually non-existent because of the drought.

Bacillus sp., soft rot, was universally present late in the harvest season but the loss was light.

Fusarium oxysporum f. lycopersici, wilt, was found in one county (Davidson) in central Tennessee and in 2 counties in western Tennessee. In Davidson County 43% wilt occurred in 8 acres in one field and 15% in 3 acres in another field. In these 2 fields alone the estimated loss to the farmers was \$500. In a 3-acre field planted to tomatoes at least 2 years in succession, using the same untreated seed bed, 100% wilt was present. In western Tennessee wilt was associated with poor cultural practices.

Heterodera marioni, rootknot, was observed in 3 counties in eastern Tennessee. A 4-acre field in Sevier County was a total loss (some \$500.) chiefly due to rootknot.

Phytophthora infestans, late blight of the foliage and fruit was found once, on a small patch of tomatoes at Pressmen's Home, Tennessee. The diagnosis was verified by Dr. C. D. Sherbakoff.

Phytophthora parasitica, buckeye rot, was serious in Jefferson County and was found in Knox and Warren Counties. In Jefferson County a cannery estimated 85% loss of the fruit on 500 acres (\$55,000).

Mosaic (virus), Insignificant losses could be attributed to mosaic.

In the dry southwestern part of the state red spider nearly destroyed many small patches of tomatoes. It was not a problem elsewhere in the State.

Sun scald was serious in only a few fields visited.

PHASEOLUS VULGARIS, BEAN

The important bean area of Tennessee is in Johnson and Carter Counties. Nine fields (204 acres) of the main crop and 3 fields (25 acres) of the late crop were surveyed. Only small plots (except 10 acres near Nashville) were seen outside these counties.

Colletotrichum lindemuthianum, anthracnose, was severe in local areas in Johnson and Carter Counties. Fifty-three acres seen were abandoned because of it, 18 acres had 10 to 45% loss, and 100 acres were anthracnose-free. This was in the main crop. It was dry for the late crop and anthracnose was no problem.

Pellicularia filamentosa (Corticium vagum), pod rot, affected from 20 to 35% of the pods in 3 of 6 Victory gardens examined.

Fusarium solani f. phaseoli (*F. martii phaseoli*), dry root rot, was responsible for 40% loss in 2 fields totaling 22 acres, one at Nashville and one in Johnson County.

Heterodera marioni, rootknot, resulted in 50% loss in a Knox County Victory garden and apparently was the cause of 100% loss of 8 acres in Sevier County.

Isariopsis griseola, angular leaf spot, was frequently found in Johnson County but was of little economic importance.

Xanthomonas phaseoli, bacterial blight, affected most of the plants in a 1-acre field in Union County.

RHEUM RHAPONTICUM, RHUBARB.

Two small fields were observed. In Sevier County a 1-acre plot was marketed the first year because of Phytophthora sp., crown rot. Crown rot destroyed the second plot observed.

SOLANUM TUBEROSUM, POTATO.

Only about 10 acres of potatoes in the field were observed.

Phytophthora infestans, late blight, verified by Dr. C. D. Sherbakoff, was present over a 3-acre field at Pressmen's Home with 50% defoliation in the worst-affected areas. The potatoes were just beginning to bloom. The farm superintendent said it was the second time he had seen late blight there in some 25 years. According to the State Inspector no late blight was present on the Cumberland Plateau this year.

Dr. G. Steiner identified meadow nematode (Pratylenchus pratensis) as the cause of considerable loss to 5 acres of Chippewas on the Cumberland Plateau.

A trace of spindle tuber (virus) in Sequoias was seen at a grader at Crossville.

CEREAL DISEASES

SORGHUM VULGARE, SORGHUM. About 6 sorghum patches of 1 or 2 acres each were observed. Colletotrichum lineola, anthracnose, was severe at Pressmen's Home. A purple leaf spot was abundant at Pressmen's Home and was present in Union County in eastern Tennessee, and in Robertson County in central Tennessee.

ZEA MAYS, MAIZE, INDIAN CORN. Thirty-five fields of corn were surveyed, 19 in eastern Tennessee and 8 each in central and western Tennessee.

Bacterium stewartii, leaf blight phase, was found in all parts of Tennessee; from a few percent to 60% or more of the leaves were affected.

Cercospora sorghi, leaf spot. A slight amount was found in upper east Tennessee.

Cercospora zeae-maydis, leaf spot, identified by Dr. Charles Chupp, was found in 6 eastern and one central Tennessee Counties in a severe form in some of them. It was the dominant leaf spot in some areas. It had not been known to occur in the State previously.

Diplodia zeae, dry rot, was found in measurable amounts only at the Experiment Station at Knoxville where it varied from about 1 to 8.5% of the ears affected in 7 open-pollinated varieties.

Fusarium moniliforme, ear rot, was of no economic importance and was found following cornear worm injury.

Helminthosporium spp., were abundant in eastern Tennessee and to a less extent in central Tennessee. They were virtually absent in western Tennessee. At Crossville, H. turcicum was the dominant species; it was also found quite generally in eastern Tennessee. At Knoxville 3 different species or races were found.

Puccinia sorghi, rust, was found only occasionally.

Ustilago maydis (U. zeae), smut, was found in about 25% of the fields, especially in eastern Tennessee, varying from 1 to 6% of the ears affected.

Potassium deficiency was severe in southcentral Tennessee extending toward the western end of the State.

FRUIT DISEASES

AMYGDALUS PERSICA, PEACH

Five orchards were observed. The crop generally was frozen out this year.

Xanthomonas pruni, bacterial spot. A trace was found in a western Tennessee (Weailey County) orchard; it was of general occurrence in a middle Tennessee (Davidson County) orchard; and destroyed an estimated 7% of the foliage in an eastern Tennessee (Bradley County) orchard.

Monilinia fructicola, brown rot. In one Bradley County orchard the grower estimated a 30% loss (50 bushels valued at \$175.) in a 2% crop.

Dead trees. About 13% of the trees in a large orchard in Roane County were dead or dying. The cause is unknown, but is probably borers.

MALUS SYLVESTRIS, APPLE.

Seventeen orchards were visited representing the eastern, central, and western parts of the State. In addition, considerable information was obtained from Mr. A. N. Pratt, State Horticulturist. A serious killing frost during bloom greatly reduced yields and led to inadequate spraying of the remaining fruit.

Gloeodes pomigena, sooty blotch, occurring in eastern and central Tennessee indicated the omission or slighting of early sprays.

Glomerella cingulata, bitter rot, was found in 6 orchards in eastern and central Tennessee. It resulted in serious losses in 2 orchards.

Gymnosporangium clavipes, quince rust, diagnosed by Dr. Paul Miller, was found in eastern, central, and western Tennessee, usually in small amounts, but causing concern and resulting in as much as 10 to 15% loss on some varieties in a few orchards.

Gymnosporangium juniperi-virginianae, cedar rust, was found in an occasional orchard and was severe on the foliage of a large orchard in Johnson County.

Leptothyrium pomi, fly speck, generally accompanied sooty blotch but was of little economic importance.

Phyllostica solitaria, blotch, was found in only 2 orchards where the spraying was seriously neglected.

Phylospora obtusa, black rot, was universally present and was, perhaps, the most serious apple disease this year. Black rot of the fruit frequently followed codling moth injuries which were all too numerous, and frog-eye of the leaves was often serious.

Venturia inaequalis, scab, was found in the eastern part of the State and was a problem only when spraying was neglected. It was virtually absent in the dry western part of the State.

External cork, verified by Dr. W. D. Mills of Cornell University, was found in central Tennessee in varying but not great amounts.

DISEASES OF SPECIAL CROPS

ARACHIS HYPOGAEA, PEANUT. A number of fields were observed in western Tennessee. By the end of August the foliage was quite disease-free because of the drought. Sclerotium rolfsii, southern blight was of minor importance, 2% infection was found in one Madison County field, and a trace in another.

CANNABIS SATIVA, HEMP. In all but one of a number of fields observed, generally from the car, no diseases were noted. Sclerotium rolfsii, southern blight, was not observed except at the Experiment Station at Knoxville where about 10% of the plants in about one acre were affected late in July and the disease was spreading.

GOSSYPIUM HIRSUTUM, UPLAND COTTON. Cotton was not closely observed. Fusarium oxysporum f. vasinfectum, wilt, in one 4- or 5-acre field in Madison County, destroyed nearly all the plants in a few spots. Due to potassium deficiency "red rust" was very general and quite severe in western Tennessee.

NICOTIANA TABACUM, TOBACCO. Very little time was given to tobacco and only a few isolated observations are given here.

Severe infection with Cercospora nicotianae, frog-eye, was observed in 4 acres in Maury County with the lower 3 to 5 leaves dead and perhaps a 20% loss. Specimens of Conopholis americana, squaw-root were sent to Dr. Sherbakoff from Giles County. The parasite was general over the field. The loss is unknown. Pseudomonas tabaci, wildfire, was severe in a 2-acre field in Green County and the farmer was cutting the tobacco green to save it.

One to 2% mosaic (virus) was noted in several fields in Cocke and Green Counties. Loss was negligible. An acre planting in Sevier County had 7% ringspot (virus) infection.

DISEASES OF SOYBEANS AND PEANUTS IN THE CAROLINAS IN 1943¹

R. E. Atkinson

SOYBEAN. This report covers only the diseases found in the latter part of the growing season. Most of the fields were visited in September and October. At that time the early varieties were ripe and had shed their leaves.

Soybeans are grown principally in the Coastal Plains section of North and South Carolina. In 1942 in this eastern section of North Carolina 242,000 acres of soybeans were planted. In South Carolina cowpeas are much more popular as a hay crop and soybeans are grown to a limited extent.

In the course of the survey varietal test plots at the Pee Dee Experiment Station, Edisto Experiment Station, and the Coker Seed Company test farms at Hartsville were visited in South Carolina. In North Carolina the Piedmont and the Willard Experiment Station varietal tests were observed. In addition, 126 fields of soybeans were inspected in North Carolina, totaling approximately 2520 acres. In South Carolina only 45 fields were inspected, totaling approximately 1,440 acres.

The severe drouth conditions along the eastern seaboard extended through North and South Carolina. It affected soybeans disastrously and yields of beans, never as high as in midwestern States, were at unprecedented lows. Many fields planted for seed were cut for hay.

Bacterial Pustule. The severe defoliation commonly observed was always accompanied by severe spotting of leaves by Xanthomonas phaseoli var. sojense, but was usually attributed to the drouth. Bacterial pustule was by far the most prevalent and most severe disease on soybeans in both States. It was present in all areas of the two States except for a few fields in the Piedmont region of South Carolina, where the Gtootan variety

¹ This report was compiled by the author with the cooperation of Dr. S. G. Lehman, Plant Pathologist, N. C. State College, and Dr. George M. Arm-Strong, Head, Botany and Bacteriology Department, Clemson College, S.C.; and the section on peanuts with the cooperation of Dr. Luther Shaw, Chairman of Plant Pathology, North Carolina State College, Raleigh, N. C.

is still generally grown. The most popular varieties in South Carolina are the Volstate and the Arksoy, the latter being more severely infected than other varieties. In North Carolina fields of Mammoth Yellow, Tokyo, and Biloxi were commonly seen heavily infected with this bacterium.

In test plots the bacterial spot was notably severe on Seminole, Volstate, Tokyo, Biloxi and White Biloxi, Mammoth Yellow, Arksoy, Rose Non Pop, Charlee and Edsoy. It was less severe on Ogden and Clemson Non Shattering.

Bacterial Blight. It was difficult to differentiate with certainty between Bacterial pustule and Bacterial blight in the field. Perhaps in one of 10 fields a few spots would be found that were apparently caused by Pseudomonas glycinea. Nothing was observed in North and South Carolina in 1943 that would confirm the impression that bacterial blight is usually evident in every field and probably the most conspicuous and common disease of the soybean; at least that did not hold true in this region in 1943.

Mosaic. Mosaic was especially common on Seminole, Avoyelles, Biloxi and Yelredo in test plots. It was quite apparent that there are many different types of symptoms produced on the same variety that may be due to different viruses. In many instances leaf hopper injury rendered the mosaic symptoms difficult to see except on young leaves. The varietal expression of symptoms produced by both viruses and bacteria needs further study.

Mosaic was an important problem only in several fields of the Seminole variety grown near McBee, South Carolina. This grower had contracted with the government to grow 350 acres of Seminole, (an edible variety especially suited to the tropical conditions) which was to be used for planting. The drouth had reduced expected yields to around 5 bu. per acre. Leaf hoppers were abundant and the fields had been damaged by the feeding of this insect.

In his contracted fields 10% of the plants had mosaic, only 1% causing a severe stunting and rendering the plants practically sterile. This severe form is probably due to seed-borne or seedling infection.

In a field of 3 acres planted with selected seed fully 80% of the plants had mosaic. In the central part of the field half of the plants had the severe type of symptoms. This central area bordered on a field of corn with cowpeas planted between the rows. The cowpeas were uniformly infected with mosaic. According to the grower there was an abundance of leaf hoppers in this field also.

The presence of mosaic in these contracted fields would appear to limit the seed to use for human consumption. To use the seed for planting would be decidedly unwise.

Frogeye. Frogeye (Cercospora sojina) was found in trace amounts in all the test plots, but in 2 areas it was severe and causing damage. In southeastern North Carolina several fields of Biloxi and one field of Otootan were severely damaged by defoliation. Lesions on these varieties were observed on the leaves, stems, and pods. On Biloxi 25% and on Otootan 40% of the remaining leaf surface was affected.

In southwestern South Carolina on Otootan and another undetermined variety the leaf spot was 100% prevalent but damage was less extensive.

In test fields Cercospora was observed on Edsoy, Ogden, Biloxi, Ctootan, Laredo, Charlee, and Missoy. Palmetto was very resistant or immune. The disease was more prevalent in late plantings.

Anthrachnose. This disease was found in all test plots on the Rocusun variety, which had from 25 to 100% of the pods blasted by the fungus Glomerella glycines. Varieties growing in adjacent rows were not infected. At the Piedmont Station the fungus was also found on Ral soy. At Monetta and Florence in South Carolina this disease was reported on Georgia 723.

Downy Mildew. Peronospora manshurica was found in trace amounts in all areas of the 2 States, although it was not important except as a possible source of seed infestation. Downy mildew was most severe in north-eastern North Carolina where in late fields of Mammoth Yellow and Wood's Yellow the disease was 100% prevalent. Some plants were so thoroughly infected that the disease appeared to be systemic. No infection was found on the pods and the area was not again visited so the condition of the seed is not known.

Southern Blight. This disease was found throughout the 2 States. The response to the disease varied greatly. In a field of Arksoy 20% of the plants were killed by Sclerotium rolfsii. In another field of 30 acres 10% of the plants were killed and close by in a field of the same variety only 3% of the plants were killed. In a field of Biloxi 10% of the plants were killed just as they reached maturity.

In southwestern South Carolina the lesser corn borer heavily damaged fields of peanuts, cowpeas, and soybeans. Although S. rolfsii is not ordinarily thought of as a weak or secondary parasite, many plants almost girdled by the borer were attacked by S. rolfsii. It would be interesting to know the degree of interaction between the insect and the fungus. In one field the yield was reduced at least 20% by the fungus and the insect.

At Windsor, North Carolina a severe outbreak of southern blight in the test plots enabled the tentative classification of the varieties on the basis of their reaction to the disease. In several replications, Palmetto, Manloxi, Seminole, Biloxi, White Biloxi, and Yelredo were rated very susceptible, Mammoth Yellow, Macoupin, and Arksoy, susceptible, and Mamotan 6640, Clemson Non Shattering, and Wood's Yellow as resistant. In a nearby field of Arksoy there was 15% reduction in stand by S. rolfsii while a field of Wood's Yellow had less than 1% of the plants affected.

Miscellaneous Diseases. Charcoal rot caused by Sclerotium bataticola was found in trace amounts in many fields. In all test plots the variety Boone was 100% infected. Other early varieties were reported infected. Macrophomina phaseoli was collected on Seminole on stems 2 to 3 feet above the ground. The pycnidia and spores were identified by Dr. S. G. Lehman.

Fusarium wilt (Fusarium sp.) was especially severe in test plots on Yelredo. Wilt was also collected, and Fusarium isolated in South Carolina by Dr. Armstrong. Rootknot (Heterodera marioni) was found in many fields, but the damage caused was difficult to estimate.

Nematospora sp., the cause of yeast spot of soybean, was reported from many localities by Dr. S. G. Lehman (PDR 27:22):602. Nov. 1, 1943).

Pod and stem blight (Diaporthe sojae) and brown spot (Septoria glycines) were not seen this year.

Unidentified Diseases. A circular brownish spot, not quite so reddish brown and less angular than that caused by Septoria glycines, was found on Nanda, Wood's Yellow, Brunette, Tokyo, Wannamaker, Delsta, and Seminole at the Pee Dee Station. The first 3 varieties were heavily infected. At the Coker Seed Company plots 26 miles away the disease was not seen. In northeastern North Carolina some fields had only a trace, others were plastered with the spot. In one field severe spotting was associated with complete defoliation. In microscopic examination of leaves from different fields spores of Helminthosporium were found in considerable numbers. Isolations have thus far failed to yield cultures of Helminthosporium, the most common fungus isolated being Alternaria tenuis.

At the Piedmont Experiment Station a white stem spot was found on Clemson Non Shattering, Volstate, Tennessee Non Pop, Wood's Yellow, and Mammoth Yellow. No fungus could be found fruiting on or near these spots, and there was no evidence of insect punctures or eggs present. The color of the spot was due to the dead bleached epidermis which was tautly stretched over a sunken canker-like cavity. The white epidermis was often split or cracked. Isolations from these spots have failed to yield any certain fungi consistently.

PEANUTS. Peanuts are grown in 3 areas of the Carolinas. In the oldest area, in northeastern North Carolina where peanuts are grown most intensively, over 200,000 acres were planted in 1942. The oldest peanut-growing area in South Carolina extends along the state line across from Augusta, Georgia, toward Charleston, South Carolina. In this area, 36,000 acres of peanuts were planted last year. The newest is a more or less continuous area in the 2 States, and coincides with the border bright leaf tobacco belt. In the new area over 20,000 acres were planted to peanuts in South Carolina and 30,000 in North Carolina.

The estimated loss from peanut leafspot has varied in past years from 1 to 2% in South Carolina to 20 to 30% in North Carolina, Virginia, and Georgia. The reason for this discrepancy was one of the purposes of the peanut disease survey. Another object was to ascertain if the leafspot was severe enough in the new areas to make a blanket recommendation that all growers dust peanuts.

Leafspot. The leafspot caused by Cercospora spp. is universally present. It was found in every field examined and undoubtedly occurs before harvest in all plantings. The prevalence, however, varied from a trace to 100%, and the severity from 0 to 50%. In some fields only a tuft of heavily spotted leaves remained on the stems at harvest time. In general, the disease was less severe this season than for many years. The decreased severity was probably due to the severe drought of late summer and early fall which also decreased yields in all areas.

Leafspot is closely associated with maturity and does not become severe until about two weeks before harvest. Thus, in fields side by side the same variety will vary greatly in the amount of leafspot, depending on the date of planting. This was particularly conspicuous in a field in which adjacent rows were planted at different times by the same planter, and with the same seed. The rows planted early had severe leafspot with 25% defoliation. The part of the field planted later had only a scattering of spots on the lower leaves and no defoliation.

There was less leafspot in the new than in the older areas, in general, but many fields in the new area had leafspot as severe as in the older areas. The low infection in the newer area may have been due to the poor stands, which were very common in the fields in this area. The poor stands have been attributed, after a careful survey by W. C. Nettles, Extension Entomologist at Clemson, to clogging or some other mechanical failure of the planter. Poor stands are rare in the old peanut-growing area in North Carolina.

The average defoliation was 50% in the old peanut-growing areas of North and South Carolina, respectively, and 30% in the new area. This probably means that the loss was from 10 to 20% in the old areas and from 5 to 10% in the new area.

It would seem therefore, that if a farmer has a good stand, dusting for the control of leafspot should be recommended in all areas.

Southern Blight. Dead plants or branches killed by Sclerotium rolfsii varied from 0 to 10%. It seemed to be as common in the new area as in the older areas. No relation between the previous crop and the prevalence of the fungus was observed. Perhaps if the prevalence of susceptible weed hosts in the previous crop were known, a relationship might be established. A plant may be completely killed by S. rolfsii but more often only a few dead branches mark the attack of the fungus. Dead and partially dead plants have been found to total as high as 10% of the plants. Many affected plants were apparently vigorous and healthy, the only sign of disease being the loose strands of the fungus growing among the fallen leaves at the crown of the plant. That these plants are severely damaged cannot be doubted for often when they are pulled and shaken only a few nuts remain attached. The pegs (gynophores) were rotted through by the fungus at soil level. Some of the nuts left in the soil were sound and undamaged; usually about half of them were rotted. Plants adjacent in the row to plants killed by S. rolfsii may or may not be affected.

Nut Rot. Another and apparently unrelated source of great loss to the farmer is the rot of peanuts in the soil. This has not been adequately surveyed but on plants dug at random in fields sometimes half of the nuts on a plant were rotted. There are apparently many insects that damage nuts in the soil but most of the rotted nuts were free from any obvious insect injury. This nut rot was not associated particularly with injury to tops by Sclerotium rolfsii but the possibility that this fungus by damaging the pegs, predisposes the nuts to rot should be investigated.

Shortly after these peanut rots were reported (September 18) rotted peanuts were cultured. Most rotted nuts yielded the common molds as Penicillium, Trichoderma, and Rhizopus. The fact that these organisms are non-parasitic stressed the possibility stated above, that damage to the pegs by S. rolfsii might predispose the nuts to rot.

About the middle of October when peanut harvest was in progress the writer returned to Raleigh, North Carolina. By this time alarmed reports were coming in from farmers in the old peanut area who were finding a high percentage of rotten peanuts. The expected 2/3 of a crop had dwindled in many cases so greatly that fields were not worth stacking and picking. Although great reductions in yield were undoubtedly due to a poor growing season which prevented setting of nuts except at the crown of the plant, a reduction of at least 50% in several counties was due to the rotting of

nuts in the ground and to the severance of the peg by S. rolfsii causing the nuts to drop off the vine. The nut rot was not severe in the old peanut growing area of South Carolina. The condition of the nuts after picking was not observed in the new area.

Miscellaneous Diseases. Bacterial wilt (Pseudomonas solanacearum) was reported from Northampton County and nematode injury (Heterodera marioni) was found in a field of the Virginia Bunch variety in Bertie County, North Carolina.

Leaf hopper "burn" was followed by various fungi, mostly species of Alternaria, which caused the tips of the injured leaflets to turn black and die.

SUMMARY OF PLANT DISEASE SURVEYS IN GEORGIA, 1943

G. M. Stone

VEGETABLE CROPS

ABELMOSCHUS ESCULENTUS, OKRA. A high percentage of the plants were wilted by Fusarium wilt (F. oxysporum f. vasinfectum) in a field in the Augusta area, and the disease was also found in gardens in this area, in north Georgia, and the Griffin area. Rootknot (Heterodera marioni) was prevalent in practically all gardens examined.

BRASSICA OLERACEA var. BOTRYTIS, CAULIFLOWER. Bacterial leaf spot (Pseudomonas maculicola) was general throughout 16 acres on the crop just beginning to head near Darien, but caused little damage. Nearly 100% infection by black rot (Xanthomonas campestris), with about 15% of the plants dead at the time of observation, occurred in 16 acres at Woodbine.

BRASSICA OLERACEA var. CAPITATA, CABBAGE. Most fields examined in the mountain section of north Georgia had been cut over at least one time. In these fields the remaining plants were usually severely infected by black leaf spot (Alternaria circinans). Worm damage was heavy and an undetermined soft rot followed the worm injury in many heads.

CAPSICUM FRUTESCENS, PIMENTO PEPPER. The following diseases were observed in the commercial area at Griffin. Only a few pods were found affected by anthracnose (Glomerella cingulata). Bacterial spot (Xanthomonas vesicatoria) was found in all fields examined, infection varying from general but light infections in some fields to severe infections in others. Plants in a few fields had been heavily defoliated. Little damage to the fruit resulted. A limited amount of blossom-end rot (physiogenic) was found, but more occurred than of anthracnose or ripe rot. Cercospora leaf spot (C. capsici) was general in all fields examined and causing heavy defoliation with killing back of the tender branches in several fields. Mosaic (virus) was general in all fields examined; usually a high percentage of the plants were infected. Ripe rot (Vermicularia capsici), which is most destructive in wet seasons, was found this year in only one crop delivered to the canner in Griffin. Rootknot (Heterodera marioni) was general in many fields examined and was severe in 3 fields. About 10%, on the average for the fields examined, of the plants were killed by

southern blight (Sclerotium rolfsii).

It was estimated that at least 25% of the entire Georgia crop was lost due to disease.

IPOMOEA BATATAS, SWEETPOTATO. Black rot (Endoconidiophora (Ceratostomella) fimbriata) was general; an occasional crop with heavy losses was observed. Leaf spot (Phyllosticta batatas) was general but infection was light with no apparent damage. Stem rot (Fusarium oxysporum f. batatas) occurred generally over the State, but no more than 1% of the plants were affected except in an occasional field.

LYCOPERSICON ESCULENTUM, TOMATO. Several small fields (1/2 to 1 acre) in north Georgia were observed to be severely damaged by early blight (Alternaria solani). The leaves and tender branches were killed and a high percentage of the fruit was rotted. Blossom-end rot (physiogenic) was also prevalent and rootknot (Heterodera marioni) was moderately severe in the same fields. In a 3-acre field in Augusta, southern blight (Sclerotium rolfsii) was the principal cause of the loss of 50 to 60% of the stand, while 10 to 15% of the remaining plants were wilted by Fusarium wilt (F. oxysporum f. lycopersici).

PHASEOLUS VULGARIS, BUNCH BEANS. The late crop was examined in the mountain section of north Georgia. Anthracnose (Colletotrichum lindemuthianum) caused severe damage in 2 fields planted with seed of unknown origin. Bacterial blight (Xanthomonas phaseoli) occurred in scattered infections on stems and pods in one field. Mosaic (virus) was general in most fields. In several fields as many as 35% of the plants were diseased. Powdery mildew (Erysiphe polygoni) was general in all fields; in some all above-ground parts were affected and damage was severe. Scattered infection of Rhizoctonia stem and pod rot (R. solani) was observed on stems and pods in one field. Rootknot (Heterodera marioni) was found in many creek-bottom fields. It was causing severe damage in 2 fields. Rust (Uromyces phaseoli var. typica) (U. appendiculatus) was found in all fields examined. Severe infections occurred in many fields, with the pods "rust-ed."

DISEASES OF SPECIAL CROPS

ARACHIS HYPOGAEA, PEANUT. Cercospora leaf spot (C. personata and C. arachidicola; no effort was made to distinguish between the 2 species) was found generally over the entire State. It was decidedly more severe in the old peanut-growing area in south Georgia. Defoliation was heavy in many fields of Spanish peanuts; apparently it was less severe on the runner types. Damage in the old belt amounted to at least 10%.

Phyllosticta leaf spot (apparently P. phaseolina) was reported by Naomi C. Woodruff of the Georgia Experiment Station. It was found scattered in several fields where it caused little damage.

Southern blight (Sclerotium rolfsii) was almost as widespread as the Cercospora leaf spot. It caused greatest damage in the old belt where a high percentage of the plants were infected. Losses were extremely heavy in some sections, especially where harvest was delayed. Damage was greater than was reported earlier.

GOSSYPIUM spp., COTTON. Angular leaf spot (Xanthomonas malvacearum) was general in all fields but infection was light. Anthracnose (Glomerella gossypii) occurred on scattered bolls in several fields. In one field from 5 to 10% of the plants were wilted by Fusarium wilt (F. oxysporum f. vasinfectum); 2 fields were observed with severely wilted "spots". Scattered bolls in several fields examined were affected by Fusarium boll rot (Fusarium spp.). Severe infestation by rootknot (Heterodera marioni) was observed in a field in the Griffin area.

SACCHARUM OFFICINARUM, SUGAR CANE. Red rot (Colletotrichum falcatum) is reported to have been prevalent in banks in 1943, but losses were moderate. Mosaic (virus) was general on susceptible varieties. Losses were heavy in many patches.

NICOTIANA TABACUM, TOBACCO. Except for a few isolated cases of fairly high percentages, not more than 1% of the plants were infected by bacterial wilt (Pseudomonas solanacearum). Downy mildew (Peronospora tabacina) was epidemic in Georgia in the spring of 1943. About 80% of the plants in beds were killed. However, sufficient plants survived to set the crop. (From oral report by J. G. Gaines, Coastal Plain Experiment Station, Tifton).

MISCELLANEOUS HOSTS

CARYA ILLINOENSIS, PECAN. Early infections by scab (Cladosporium effusum) were heavy on susceptible unsprayed varieties over the entire southeastern belt pecan area. Losses for the entire season on unsprayed susceptible trees ranged from 25 to 75%. Brown leaf spot (Cercospora effusa) and downy spot (Mycosphaerella caryigena) were prevalent under the same conditions as scab. Rosette (zinc deficiency) was of minor importance in 1943 (Information furnished by John R. Cole, Pecan Field Laboratory, Albany).

VIGNA SINENSIS, COWPEA. Bacterial leaf spot (Pseudomonas syringae) (Bacterium vignae) was found scattered in several fields. Cercospora leaf spot (C. cruenta) was general in all fields examined but caused little damage. Five to 10% of the plants in one field were wilted by Fusarium wilt (F. oxysporum f. tracheiphilum) (F. vasinfectum var. tracheiphilum). Leaf spot (Aerospirium oeconomicum) was found in all fields examined but was very scattered in distribution and apparently caused no damage. Powdery mildew (Erysiphe polygoni) caused general and severe damage in many fields where plants were defoliated and tender branches killed back.

ZEA MAYS, CORN. Ear rot (Fusarium moniliforme) was severe on several varieties in the University variety test at Athens, and was prevalent in fields examined in south Georgia. Smut (Ustilago maydis) (U. zeae) was found scattered in all fields examined.

SUMMARY OF OBSERVATIONS ON PLANT DISEASES IN FLORIDA
DURING THE EMERGENCY PLANT DISEASE PREVENTION PROJECT SURVEYS
JULY 25 TO DECEMBER 31, 1943.

Arthur S. Rhoads

VEGETABLE CROPS

Weather conditions during late September and the first half of October were generally unfavorable for farm operations in the truck crop sections of Florida. Heavy rainfall greatly delayed operations, with extensive losses to seedbeds and early plantings in some sections. Later in the season lack of soil moisture retarded crop production in some sections without subirrigation. General shortage and high cost of labor, particularly of experienced workers, proved to be a great handicap to growers and in many cases portions of crops had to be sacrificed where there was little likelihood of their proving profitable with the excessive labor cost. Damage from cold weather caused extensive losses to many of the more tender crops in different sections of north central and central Florida.

BRASSICA OLERACEA var. BOTRYTIS, CAULIFLOWER. Xanthomonas campestris, black rot, was found to be serious in one 5-acre planting at Sanford, where the disease apparently had been attacking plants since they were fairly young and was causing wilting and dying of plants large enough to begin forming heads. The plant loss was estimated to be 30% and the disease appeared to be spreading rapidly.

BRASSICA OLERACEA var. CAPITATA, CABBAGE. Peronospora parasitica, downy mildew, was found to be of widespread occurrence in practically all the cabbage-growing areas visited in north central and central Florida, frequently resulting in heavy loss of plants in the seedbeds where growers were not in position to dust or spray at frequent intervals or failed to do a timely or thorough job. Evidence of this disease was noted on the older leaves of heading plants in a number of localities but in no case did it appear to cause any appreciable injury to the crop.

Rhizoctonia root rot was observed to cause losses in parts of new plantings at a few places but they were mostly small and local in extent. A more serious case of this trouble was observed in a much older 5-acre planting at Winter Garden, where the plant loss was estimated at 5%.

One grower at Zellwood, who had 50 acres of cabbage seedbed sown in drills, reported that this planting was lost by cold weather, the temperatures going down to 25, 26, 27 and 30° F. on 4 consecutive mornings. This was an especially serious loss as he claimed to have had sale contracts for 2 million plants and the cold killed them about a week before they would have been ready for marketing.

CAPSICUM FRUTESCENS, PEPPERS. Plantings of peppers were greatly retarded by excessively wet soil conditions and some acreage at Winter Garden and Minorville was killed, while in other cases the plants recovered but tended to remain abnormally small.

Cercospora capsici, leaf spot, was of widespread occurrence in one of the few fields seen at Sanford, where it caused considerable defoliation. In the Winter Garden area, however, where the new blight-resistant Worldbeater variety was grown exclusively, the amount of leaf spot was negligible.

Rhizoctonia solani apparently was responsible for occasional dying of plants in one 16-acre field at Winter Garden. Miscellaneous fruit rots occurred in most fields visited, especially where fruit rested on the ground, but losses from this cause were relatively small and partly aided by worms.

Pepper plantings examined in the northern part of the State were remarkably free from diseases and particularly mosaic, which was later observed to occur very extensively in some plantings in the vicinity of Dania on the lower East Coast.

CICHORIUM EMDIVIA var., ESCAROLE. Alternaria cichorii, leaf spot, was observed in one local area in one large field being cut at Sanford, necessitating heavy trimming to eliminate the unsightly-appearing outer leaves. This disease also was noted occurring quite generally in a 2-acre planting at Minorville. It is rarely troublesome during the cooler portion of the year and during that season fields are planted solidly, with no space left to permit driving through with spray machines.

CUCUMIS SATIVUS, CUCUMBERS. Pseudoperonospora cubensis, downy mildew, was the only disease that proved to be troublesome in plantings in the Wauchula section and those found at a few other points. The mildew was being held under control fairly well by dusting but in some cases the dusting did not appear to have been done with particular thoroughness of coverage so far as the lower sides of the leaves were concerned. One planting of 1 1/2-acres was so severely attacked by mildew as to probably reduce the yield by 50%, especially as picking had not yet begun. Cold winds caused considerable leaf injury in two 10-acre plantings at Clearwater and Winter Garden, respectively. Rootknot (Heterodera marioni) was rather prevalent in one 10-acre planting at Winter Garden.

CUCURBITA PEPO var. CONDENSEA, SQUASH. Little in the way of diseases was observed in scattered plants of squash in Alachua and Marion Counties, most of which were small. Pseudoperonospora cubensis, downy mildew, was observed in some plantings but had not become sufficiently severe to result in any particular crop curtailment. A trace of blossom blight (Choanephora cucurbitarum) was observed in a few plantings and cucumber mosaic (virus) was noted on a few fruits in one planting. The plantings in these 2 northern counties were all killed prematurely by early frost.

DAUCUS CAROTA, CARROTS. Poor stands in young plantings on muck soil at Zellwood were attributed partly to dryness and coarseness of the surface soil in portions of the fields and to cold injury while the plants were still very young. No diseases were observed in any of the plantings examined.

IPOMOEA BATATA, SWEETPOTATO. Plantings of sweetpotatoes examined at various points in north central and western Florida appeared quite free from diseases so far as the vines were concerned. The only diseases observed were white rust (Albugo ipomoeae-panduranae) and leaf blight (Phyllosticta batatas) and neither were sufficiently severe to be of any particular consequence.

LYCOPERSICON ESCULENTUM, TOMATOES. Alternaria solani, early blight, was found to have caused considerable infection of leaves of plants in one local area of an unusually fine 30-acre planting on prairie land west of Rockledge, which was nearly ready for picking. However, this disease was

kept under control by spraying and a very profitable crop made. The success of this planting was jeopardized by heavy rainfall earlier in the season but an additional pump was secured and installed in time to save all but about an acre in a depressed area that could not be drained so effectively.

PHASEOLUS VULGARIS, SNAP BEANS. Only a few small plantings were observed and these mostly after most of the crop had been picked. Most of these showed areas where the plants were more or less yellowed and occasionally somewhat stunted from infestation by jassids.

PISUM SATIVUM, PEAS. Rhizoctonia root rot apparently was responsible for dying and loss of from 35 to 40% of the plants in a 1 1/2-acre planting at Wauchula. Other small plantings suffered losses of varying extent from cold.

SOLANUM MEOLOGENA, EGGPLANTS. Phomopsis vexans, blight and tip-over, was the most serious disease found on this crop, presenting a serious problem for growers in Alachua and Marion Counties southward to central Florida. It commonly attacks plants in all stages from recent transplants to those approaching maturity. The principal injury resulted from the basal girdling of the plants, though lesions resulting in less serious injury commonly developed at other points on the stems. Rotting of the fruit was more or less common in most fields and other losses were reported in transit. No appreciable leaf spotting was apparent. Plant losses usually ranged from 10 to 25% in most fields examined and in a few cases ran up as high as 75%.

Pseudomonas (Bacterium) solanacearum, bacterial wilt, was observed to have taken a heavy toll of plants in one 10-acre field at Martin, where Phomopsis blight also was particularly widespread and many plants were unusually severely infected by rootknot (Heterodera marioni). This planting was said to have been a total loss.

Heterodera marioni, rootknot, was found infecting plants in a few fields but the one just mentioned was the only one in which they were especially severe.

Early frost killed all the fall eggplant plantings in Alachua and Marion Counties before their full productiveness was over.

CEREALS, GRASSES, AND FORAGE CROPS

CASSIA TORA, COFFEWEED. Erysiphe polygoni, powdery mildew, was of widespread occurrence on plants at Ocala and Belleview. Rhizoctonia solani apparently was responsible for the wilting and dying of patches of seedlings in a cover crop plot at Quincy where coffeeweed was grown in rotation with tobacco. Heterodera marioni, rootknot, was found infecting roots of old plants severely in another cover crop plot.

CROTALARIA. Oidium erysipoides var. crotalariae, powdery mildew, occurred abundantly on plants of C. retusa at Lake Alfred. Erysiphe polygoni, powdery mildew, was widespread on leaves of C. spectabilis, showy Crotalaria, at Melrose, Devil's Millhopper near Gainesville, and Minorville.

CYTCODON DACTYLON, BERMUDA GRASS. An undescribed species of Helminthosporium was associated with an extensive browning and dying of leaves in a test plot at the North Florida Experiment Station at Quincy.

DESMODIUM TORTUOSUM, BEGGARWEED. Oidium sp., apparently the conidial stage of Microsphaera diffusa, caused extensive mildewing of plants growing as a cover crop in a citrus grove at DeLand and as an escape at Gainesville. No perithecia developed, however, even by the time the leaves were killed by cold.

LUPINUS CUMULICOLA. Cercospora longispora was observed causing large, conspicuous sooty spots on the leaves, with considerable defoliation, at De Soto City.

ORYZA SATIVA, RICE (upland). A Helminthosporium-like eye-spot was of general occurrence in a field examined at Perry. What appeared to be the same disease was of widespread occurrence on spreading witch-grass or fall Panicum (P. dichotomiflorum) that was growing abundantly adjoining the rice field and occurring scattered throughout it. Unfortunately, the fungus was not fruiting on material collected on either host.

PANICUM. An unidentified species of Ovularia was found causing dark linear streaks on leaves of plants of P. haemitomum, maidencane, between Largo and Seminole. (See also under rice).

PASPALUM URVILLEI, VASEY GRASS. Puccinia levis, rust, was collected on this grass at Island Grove and Sanford.

PENNISETUM PURPUREUM, NAPIER GRASS. Helminthosporium ocellum, eye-spot, was of very general occurrence on susceptible varieties at the Experiment Station but occurred sparingly or not at all in test plots of selections for resistance to this disease.

PUERARIA THUNBERGIANA, KUDZU. Pseudomonas medicaginis var. phaseolicola, bacterial leaf spot, was prevalent in plantings at Quincy but the spots were small and the disease not sufficiently severe to result in much defoliation.

SOJA MAX, SOYBEANS. Frog-eye disease (Cercospora soja) (C. daizu) and bacterial pustule (Xanthomonas phaseoli var. sojense) were responsible for defoliation in variety test plots of the Experiment Station at both Gainesville and Quincy. Anthracnose (Colletotrichum glycines) commonly attacked the pods in both these localities. The prevalence of this disease, however, was not so important as it might seem since the pods usually failed to develop any appreciable amount of seed anyway.

The consistent failure to secure seed production appears to constitute the greatest drawback to soybean culture in Florida. The pods commonly fail to fill out properly and shrivel and shed prematurely. This trouble was apparent at Gainesville, Quincy and at other points in western Florida.

SORGHUM HALEPENSE, JOHNSON GRASS. Cercospora sorghi, leaf spot, attacked plants severely at Quincy. Colletotrichum lineola, anthracnose, also occurred to a slight extent on the same plants. Puccinia purpurea, rust, was prevalent on plants in the same locality.

SORGHUM VULGARE, SORGHUM. Ascochyta sorghi was found occurring sporadically on plantings of the Texas Seeded Ribbon variety at both Quincy and near Perry. Leaf spot (Cercospora sorghi) was found to be of frequent occurrence in some plantings, resulting in considerable premature dying of leaves. Anthracnose (Colletotrichum lineola) was of common and widespread occurrence in some plantings, also causing considerable premature dying of the leaves. Zonate spot (Gloeocercospora sorghi) was of fairly common occurrence in plantings of the Texas Seeded Ribbon variety at both Quincy

and near Perry, causing extensive blotching and dying of leaves. Rust (Puccinia sorghi) was found in but one of several plantings examined in western Florida, infection being noted on 25% of the plants in a portion of a field that still remained unstripped. Head molds due to Fusarium and other saprophytic fungi that commonly attack the inflorescences during the warm, humid rainy season of late summer resulted in greatly curtailed seed formation in some varieties in test plots of the Experiment Station at Gainesville.

STIZOLOBIUM DEERINGIANUM, VELVET BEANS. Leaf spot (Cercospora stizolobiae) was of widespread occurrence and an important factor in defoliation in all plantings examined, but the velvet bean caterpillar (Anticarsia gemmatilis) was by far the greatest factor in defoliation.

Potash deficiency appears to have become a limiting factor in making crops of velvet beans of late years in sections of western Florida where fertilizer is not used. Test plots of the North Florida Experiment Station at Monticello showed a marked response of plants to applications of dolomitic limestone, potash, and phosphoric acid. Potash deficiency appears to be the main limiting factor, however. Plants with no fertilizer consistently made a very weak growth, with scanty seed production. The leaves of such plants became distinctly chlorotic and the margins fired and died, and the plants became defoliated early.

VIGNA SINENSIS, COWPEAS. Leaf spots due to Amerosporium oeconomicum and Cercospora dolichi resulted in considerable defoliation in plantings at Quincy. Rhizoctonia root rot apparently was the cause of wilting and dying of seedlings in a cover crop plot at Quincy, where cowpeas were rotated with tobacco. Rootknot (Heterodera marioni) also was observed as a cause of unthriftness of plants in another field at Quincy.

ZEА MAYS, CORN (field). Puccinia sorghi, rust, caused widespread and heavy leaf infection in the case of late plantings observed at Quincy and Jay. This disease is said to attack late plantings in western Florida rather severely as a rule.

FRUIT AND NUT CROPS

ALEURITES FORDII, TUNGOIL. Clitocybe tabescens. Clitocybe root rot, was observed to be of widespread occurrence and highly destructive to trees in commercial plantings at a number of points in northern Florida, being associated especially with situations where oak trees were prevalent prior to clearing. In a 100-acre block near LaCrosse 69 trees were found in various stages of decline from this disease, 41 of these occurring in one local area, and numerous others had been removed previously.

Pellicularia koleroga (Corticium stevensii) thread blight, was of widespread occurrence and proved troublesome to trees on 130 acres of a large planting at Lamont. The disease was confined chiefly to the lower-lying land, especially where the trees were closely planted. In the lowest portion adjacent to the hammock forest virtually all the trees exhibited more or less of the disease. The company spent nearly \$800 in pruning 30 acres of trees in an attempt to control the disease, but with little evidence of success. Spraying, however, has proved very effective. Trees sprayed once in 1942 and again during the summer of 1943 appeared fairly free from the disease.

AMYGDALUS PERSICA, PEACH. Cercospora persicae, frosty mildew, was found attacking the leaves of 2 trees at Melrose.

CARYA ILLINOENSIS, PECAN. Cercospora caryigena (Mycosphaerella caryigena), downy spot, was found occasionally on trees at Monticello. Cladosporium effusum, scab, was of widespread occurrence on various varieties at Monticello and other points, causing a heavy dropping of nuts in some cases. Elsinoë randii, nursery blight, was observed occurring commonly in one nursery at Monticello, causing extensive defoliation and a ragged, unsightly appearance of seedlings. Microsphaera alni, powdery mildew, was found occasionally on nuts in 2 orchards at Monticello. Pestalotia uvicola was associated with large, irregular dead areas on leaves of trees in one orchard at Monticello. Phoradendron flavescens, mistletoe, was observed occurring with great frequency at most localities throughout Florida where pecans have been planted, ranging from Dunedin on the lower West Coast to Cocoa on the middle East Coast and northward to Monticello and DeLand. It frequently grows in great profusion on old, neglected trees.

CITRUS. Citrus groves in Volusia, Lake, Orange, Brevard, Polk, Highlands and Pinellas Counties appeared to be in finer condition in general than ever before. This is due to the widespread use of dolomitic limestone and other soil amendments and nutritional sprays that has become the general practice during the last few years. As a result of this modern program of fertilization, groves are now characterized by much less gummosis and less dead wood from bronzing, freckling, exanthema (dieback) and other diseases now conceded to result from deficiencies or lack of availability of certain essential nutritional elements. The reduction of these widespread causes that formerly contributed so greatly to the production of dead wood has in turn brought about a great reduction in the prevalence and severity of melanose.

Melanose (Diaporthe citri) was reported to be worse than usual this year in the vicinity of DeLand, owing to the cold in February, and also in Polk and Pinellas Counties, owing to rainy weather following blooming. Scab (Elsinoë fawcettii) did not appear to be particularly troublesome in any of the sections visited. These diseases, which were formerly regarded as serious factors in reducing fruit grade and marketability, are now considered relatively unimportant from an economic standpoint owing to the use of such a large proportion of the fruit for canning. Melanose is still an important factor in citrus fruit production, however, from the standpoint of the Phomopsis type of stem-end rot.

Botryodiplodia diplocarpa was found to be of general occurrence on dying branches of Tahiti lime trees in a rather neglected grove between Lotus and Tropic on Merritt Island. It causes a bluish-black discoloration of the wood similar to that caused by Diplodia natalensis (Physalospora rhodina), but appears to be essentially secondary on branches weakened or dying from various causes.

Stylar-end rot of Tahiti limes, considered to be a physiological breakdown of maturing fruit, also occurred to some extent on the more mature fruit on a number of trees in the same grove.

Clitocybe tabescens, Clitocybe root rot, was observed to have developed on 3 additional grapefruit trees on rough lemon stock in a grove at Waverly where this disease has been prevalent for a number of years. Ustilina vul-

garis was found fruiting at the base of two trees and Ganoderma appla-
natum var. tornatum on the other. These 2 fungi have been observed by
the writer in former years in this particular grove, occurring as second-
ary fungi on trees attacked by Clitocybe root rot.

Phytophthora parasitica, foot rot, continues to cause decline and death
of trees, especially in those sections where sweet seedling orange trees
are grown.

Decline of trees on rough lemon stock was observed to be prevalent
throughout the ridge section from Lake Alfred south to Lake Placid and
also in Pinellas County on the West Coast. This trouble has been occurring
for many years but the cause has not been determined. It usually occurs
sporadically on trees in certain groves and appears to develop most fre-
quently in situations where they are periodically subject to drought. Tree
losses are causing some growers considerable concern.

Saline irrigation water proved extremely injurious in a number of groves
in the Indian Rocks, Seminola and Ammona sections of Pinellas County, re-
sulting in extensive defoliation and dying back of large bearing trees.
The water table has been materially lowered over a period of years by ex-
cessive drainage and by subnormal rainfall over a period of years. Groves
suffered so severely from drought during the past year that it was neces-
sary to irrigate over a period of 9 out of 11 months. After irrigating
for some time it was found that the water pumped from artesian wells had
become quite saline in some instances. Analyses of the water showed a wide
variation in salt content and in one or two instances showed about 4800
p.p.m. of NaCl. Samples taken from various wells showed that the salt con-
tent often increased greatly after but from 2 to 3 hours of pumping.

Cuscuta americana, dodder, was found forming an extensive mat enveloping
the tops of 2 large bearing orange trees in a grove in the Eloise section near
Winter Haven.

Vines that overrun trees and cause injury in citrus groves are reported
in PDR 27:692-693.

MALUS SYLVESTRIS, APPLE. Pestalotia sp. was found associated with a
leaf spot on a single small tree 5 miles north of Milton. The spots were
small and the disease appeared to result in no appreciable damage.

MORUS NIGRA, BLACK MULBERRY. Cercospora mori, leaf spot, was collec-
ted at Quincy, Greenville, and Gainesville, sometimes being sufficiently
severe to cause extensive defoliation.

PSIDIUM GUAJAVA, COMMON GUAVA. Colletotrichum gloeosporioides (Glome-
rella cingulata), ripe rot, was of frequent occurrence at Tropic, Merritt,
and later at Homestead, the disease apparently gaining entrance at times
through insect punctures.

VITIS MUNSONIANA, BIRD GRAPE. Phyllosticta viticola, the conidial stage
of Guignardia bidwellii, leaf spot, was of frequent and widespread occur-
rence throughout central and southern Florida, occurring with great pro-
fusion on Key Largo.

VITIS ROTUNDIFOLIA, MUSCADINE GRAPE. Phyllosticta viticola, leaf spot,
occurred abundantly on wild vines at Quincy. Septoria ampelina, leaf spot,
also occurred abundantly in the same locality. A large leaf-blotch caused
by an as yet undetermined Sphaeronema-like fungus was collected on wild
vines between Bristol and Telogia.

VITIS RUFOTIENTCSA, REDSHANK GRAPE. Plasmopara viticola, downy mildew, occurred abundantly on vines in one locality between Newman's Lake and Orange Heights. An unusual fungus with grayish spore masses borne in rounded heads on stalks, apparently a species of Diplococcum, also occurred on other leaves of the same vines, causing a distinctive, irregularly zonate type of spot.

VITIS VULPINA, FROST GRAPE. Isariopsis clavispora, leaf blotch, was of infrequent occurrence between Micanopy and McIntosh.

SPECIAL CROPS

ARACHIS HYPOGAEA, PEANUTS. Cercospora leaf spot was of general occurrence in all of the many fields examined from Marion and Alachua Counties in north-central Florida to Escambia County at the extreme western end of the State. This disease usually resulted in defoliation ranging from 25 - 35%, and in one case 50%, in undusted fields. The small, short-spored spot (Cercospora personata) was the predominant one found in material examined from Marion, Alachua, Jackson, Jefferson, Santa Rosa, Okaloosa and Escambia Counties. The large, long-spored leaf spot (Cercospora arachidicola) was noted only in plantings at Aucilla, Quincy, and near Crestview. Good control of this disease was secured by dusting in tests conducted by the North Florida Experiment Station at Aucilla and Allentown. In the former locality sulfur dust was found to have given about 18% increase over undusted plots and copper-sulfur dust about 2-3% higher increase in yield of nuts on the Florida Runner variety.

Decay of nuts was reported in one field near Allentown. The nuts examined showed evidence of Rhizoctonia, and Diplodia natalensis was observed fruiting on lesions on stems of the same plants.

GOSSYPIUM spp., COTTON. Diplodia natalensis (Physalospora rhodina) was of more or less general occurrence as a cause of boll rot in many of the cotton fields visited late in the season in Jackson, Holmes, Santa Rosa and Escambia Counties.

Diplodia natalensis and Sclerotium bataticola (Macrophomina phaseoli) were both associated with a widespread dying of mature plants in one field at Madison, where plants were said to have been dying gradually since the seedling stage, resulting in about 25% loss. The latter fungus was associated with a similar dying of mature plants in a field 10 miles east of Tallahassee.

HIBISCUS SABDARIFFA, ROSELLE. Heterodera marioni, rootknot, was found infecting roots of a test planting of this crop with extreme severity, on nematode-infested land at the North Florida Experiment Station.

RICIUS COMMUNIS, CASTOR BEAN. Botrytis cinerea, gray mold, occurred abundantly in a plot-planting at Gainesville, attacking the inflorescences in various stages of development. This disease, which has been of frequent occurrence in parts of Florida for a considerable number of years, spreads rapidly during the warm, humid rainy summers and constitutes a serious hindrance to seed production.

SACCHARUM, SUGARCANE. The numerous plantings examined in north and west Florida appeared to be remarkably free from diseases, though in some cases adversely affected by dry weather. Plantings of this crop in the northern

part of the State are now limited largely to 3 disease-resistant varieties. Eye-spot (Helminthosporium ocellum) occurred to some extent in one planting near Perry but did not constitute any appreciable factor of loss. Mosaic (virus) was noted only in small patches of one of the old-time varieties at Quincy and Oak Grove. In both cases adjacent plantings of resistant varieties were free from this disease.

TREES, ORNAMENTALS, AND MISCELLANEOUS HOSTS

Observations already summarized on occurrence of Clitocybe root rot, mistletoe, dodder, wood-rotting fungi, entomogenous fungi, lightning stroke, etc., on woody plants, are not repeated here. (See PDR 27 (19): 486, Oct. 7; (20): 556, Oct. 15; (22): 632, Nov. 1; (23): 636-637, Nov. 15; (24): 694-696, 697, Dec. 1, 1943; and PDR 28 (7): 260-272, Apr. 1, 1944).

ACER CAROLINIANUM. Rhytisma acerinum, tar spot, was observed at Suwanee Springs and at Suwanee Gables east of Old Town.

AESCULUS PAVIA, RED BUCKEYE. The Phyllosticta stage of Guignardia aesculi was found causing leaf blotch and defoliation of a single tree in Torreya State Park.

ARECASTRUM ROLANZOFFIANUM, PLUMY COCONUT. Ganoderma zonatum (G. sulcatum) was observed fruiting at the bases of dying trees at Cocoa and Clearwater. Curly-top (manganese deficiency) was noted in young palms at Sebring, Dunedin, and various points along the East Coast.

ASIMINA OBOVATA, BIGFLOWER PAWPAW. Cercospora asiminae, leaf spot, was found on plants at DeSoto City.

BACCHARIS HALIMIFOLIA, EASTERN BACCHARIS. Dimeriella melioides, black mildew was found on leaves of plants at Juniper Springs, Umatilla, near Meritt Island, and between Jensen and Stuart.

BIGNONIA CAPRECLATA, CROSSVINE. Capnodium elongatum, sooty mold, was collected in Sanchez Hammock 10 miles northwest of Gainesville. Meliola bidentata, black mildew, was found occurring fairly commonly at Gainesville and points in the vicinity.

BOERHAAVIA ERECTA, ERECT SPIDERLING. Albugo platensis, white rust, was of common occurrence on this plant growing as a weed in a pecan grove at Monticello.

BROUSSONETIA PAPYRIFERA, PAPER MULBERRY. Cercospora broussonetiae, leaf spot, was observed at Quincy.

CALLICARPA AMERICANA, AMERICAN BEAUTYBERRY. Cercospora callicarpae, leaf blotch, was collected at Melrose.

CALONYCHTIS ACULEATUM, MOONVINE. Albugo ipomoeae-panduranae, white rust, was collected at Bonaventure.

CATALPA BIGNONIODES, SOUTHERN CATALPA. Cercospora catalpae was observed to be causing extensive spotting and defoliation of roadside trees near the entrance to Torreya State Park.

CEDRUS DEODARA, DECDAR CEDAR. Clitocybe tabescens, Clitocybe root rot, was found to have practically killed an ornamental tree planted in a residential property at Quincy. The disease stimulated a profuse exudation of resin from the base of the trunk, and upon dissection of the trunk it was found that extensive zones of pathologic resin canals had developed

in the growth rings formed after the disease had attacked the tree, some of the canals being continuous from the base to the tip of the tree, which was about 13 feet high. The wood of Cedrus normally is characterized by the complete lack of resin canals. Pure cultures of the fungus were secured in isolations made from the roots.

CHAENOMELES JAPONICA, JAPANESE FLOWERING QUINCE. Cercospora cydoniae, leaf spot, was of common occurrence on a few ornamental bushes at both Monticello and Quincy, resulting in almost complete defoliation in all cases.

CORNUS spp., DOGWOOD. Cercospora cornicola, leaf spot, was causing extensive defoliation of ornamental trees of flowering dogwood, C. florida, at Gainesville and Quincy. Meliola nidulans, black mildew, was fairly common at times on plants of small-fruited dogwood, C. microcarpa, about Gainesville and Silver Springs. The fungus develops profusely on twigs and even good-sized stems.

CRATAEGUS spp., HAWTHORN. Entomosporium maculatum, the conidial stage of Fabraea maculata, leaf blight, was observed to be causing considerable defoliation of trees of Ravenel hawthorn, C. ravenelii, in Sugarfoot Hammock west of Gainesville. Phyllactinia corylea, brown mildew, was found with good development of perithecia, on oneflower hawthorn, C. uniflora, in Sugarfoot Hammock.

CUSCUTA spp., DODDER. C. americana was found on orange trees (PDR 27: 692). C. compacta was found occurring abundantly on a number of native shrubs in the vicinity of lakes and bayheads at Gainesville, Micanopy, Evinston, and Monticello (See PDR 27:556, 696-697; 28: 269).

ELAEAGNUS sp. Cercospora elaeagni, leaf spot, occurred abundantly on a group of these shrubs planted at Oakland. Colletotrichum sp. also occurred in association with these spots.

ELEPHANTOPUS spp. Coleosporium elephantopodis, rust, was collected at Gainesville on stems and leaves of E. carolinianus. The uredinia were parasitized by Ramularia coleosporii. The rust occurred sparingly on plants of E. tomentosus in Torreya State Park.

EMILIA SONCHIFOLIA. Puccinia emiliae, rust, was abundant on plants at Cocoa.

ERYTHRINA HERBACEA, EASTERN CORALBEAN. An apparently new species of Cercospora was found occurring abundantly on leaves of plants in scrub woods at De Soto City, the infected leaves having the appearance of having been attacked by a rust. This is the first record at Gainesville of the occurrence of a Cercospora on this host in Florida.

EUPATORIUM CAPILLIFOLIUM, DOGFENNEL. Cuscuta compacta, dodder, was found occurring abundantly on stems of this tall weed at Evinston and Gainesville.

FRAXINUS CAROLINIA, CAROLINA ASH. Cylindrosporium fraxini, leaf spot, was found occurring abundantly at Newnan's Lake near Gainesville. This appears to be the first record of this disease for Florida and also on a new host for the fungus. The collection was made jointly with Mr. Erdman West.

GORDONIA LASIANTHUS, LOBLOLLYBAY GORDONIA. Meliola cryptocarpa, black mildew, was collected at Altoona.

GREVILLEA ROBUSTA, SILK OAK. Gummosis was observed on the trunk of a large ornamental tree at Leesburg. The cause of this trouble was not apparent but it has been attributed to Diplodia natalensis (Physalospora rhodina) in other instances. In the butt of a recently felled companion tree showing no particular evidence of gummosis, short zones of pathologic gum canals were found in the interior wood, marking a point where gum formation had occurred previously.

HAMAMELIS VIRGINIANA, WITCH HAZEL. Gonatobotryum maculicola, leaf spot, was found in Torreya State Park, this being the first record of this unique fungus in Florida. Records of it heretofore have been confined to a few northeastern States.

HYDROCOTYLE sp., PENNYWORT. Puccinia hydrocotyles, rust, occurred abundantly on this plant on low wet ground along the Indian River at Cocoa.

HYPTIS MUTABILIS, WOOD SAGE. Puccinia hyptidis-mutabilis, rust was found to occur commonly in the vicinity of Gainesville. It was collected at Windsor and Lowell also.

HYPTIS RADIATA. Puccinia hyptidis, rust, occurred abundantly on plants between Orange Heights and Melrose. A later collection made unusually late in the season in the same locality showed that the rust had become extensively parasitized by Darlucia filum.

ILEX CASSINE, DAHOON. Cercospora ilicicola, leaf spot, was found occurring sparingly at Melrose. This fungus does not appear to have been recorded from Florida previously. Capnodium elongatum, sooty mold, occurred abundantly on bushes in the same locality.

Englerulaster orbicularis, black spot, occurred so profusely on leaves of bushes in the same locality and also in Sanchez Hammock near Gainesville as to greatly reduce the value for Christmas decorations. Although the fungus was immature it was commonly overrun in both these localities by silvery gray patches of mycelium but there was no evidence of sporulation by this apparently parasitic fungus.

Pestalotia annulata, was found causing large leaf spots, mostly terminal, on plants at Umatilla.

Phacidium curtisii, tar spot, was found occurring but sparingly on plants at Melrose and only a trace of it was seen on plants in Sanchez Hammock, Silver Springs and other points. The dahoon holly does not appear to be nearly so susceptible to this disease as the American holly.

ILEX CORIACEA, LARGE GALLBERRY. Englerulaster orbicularis occurred abundantly on leaves of plants at Umatilla. Phyllosticta ilicicola, leaf spot, was collected on a few leaves of plants in the same locality.

ILEX OPACA, AMERICAN HOLLY. Capnodium elongatum was observed in Sanchez Hammock northwest of Gainesville. Englerulaster orbicularis, black spot, was found occurring commonly at various points in the vicinity of Gainesville. Phacidium curtisii, tar spot, was observed to occur commonly in the vicinity of Gainesville.

IPOMOEA TRICHOCARPA. Puccinia crassipes, rust, was found fruiting abundantly on leaves of vines at Ocala, occurring in association with Coleosporium ipomoeae.

ITEA VIRGINICA, VIRGINIA SWEETSPIRE. Septobasidium sinuosum, felty fungus, was collected at Melrose and south of Barberville, the collections being limited to a single specimen in each case. This is a hitherto unreported host record for the occurrence of this fungus.

Tryblidiella rufula was found occurring abundantly on dead twigs of shrubs south of Barberville and at Glencoe, 3 miles west of New Smyrna.

LANTANA SELLOWIANA, TRAILING LANTANA. Puccinia lantanae, rust, was collected at Gainesville.

LEONOTUS NEPETAEFOLIA, LIONSEAR. Puccinia leonotodis (P. Henn.) Arth., II, rust, was collected on this plant growing as a weed in an abandoned sand pear orchard 7 miles north of Ocala on November 8, 1943. This collection, the determination of which was verified by Dr. George B. Cummins, is the first record of the occurrence of this rust in the United States, it being previously known in the West Indies.

LIQUIDAMBAR STYRACIFLUA, SWEETGUM. Conopholis americana, squaw-root, was found growing from roots of trees in Sanchez Hammock northwest of Gainesville and at Magnesia Springs.

LYONIA FERRUGINEA, FETTERBUSH. Exobasidium vaccini, leaf galls, were of fairly common occurrence on plants at Altoona. Phacidium nigrum, tar spot, was observed occurring commonly in the vicinity of Gainesville, near Lynne on the Ocala National Forest, and west of Astor Park.

LYONIA LIGUSTRINA var. FOLIOSIFLORA, BRACTED HE-HUCKLEBERRY. Pucciniastrum myrtilli, rust, was observed occurring sparingly at Micanopy. Rhytisma andromedae-ligustrinae, tar spot, was collected on senescent leaves of the same plants.

MAGNOLIA VIRGINIANA, SWEETBAY MAGNOLIA. Meliola magnoliae, black mildew, was a common leaf blemish at Melrose. Phyllosticta glauca, leaf spot, was found to be of extremely common and widespread occurrence, collections having been made at a number of points from Crestview and DeLand south to Royal Palm State Park. Where leaf infections are abundant considerable defoliation results.

Phyllosticta magnoliae, leaf spot, was found causing extensive defoliation at Longwood. This disease is very similar to the preceding except that the spots average considerably larger and the spores are larger and not rod-like as in the preceding.

MELIA AZEDARACH, CHINABERRY. Cercospora leucosticta, leaf spot, was observed occurring abundantly on a tree south of Lotus on Merritt Island and to be of common occurrence on trees at Gainesville.

MYRICA CERIFERA, SOUTHERN WAXMYRTLE. Irenina manca, black mildew, was found occurring fairly abundantly in the vicinity of Gainesville, Melrose, along the Ocklawaha River several miles east of Silver Springs, Barberville, and in Royal Palm State Park.

Galls (cause unknown) were observed rather commonly on stems of bushes in the vicinity of Gainesville, Melrose and Juniper Springs. In the younger galls the bark was intact but in older ones prominent circular to elongated swellings occurred and the hypertrophied wood tissue was devoid of bark on the older part. This gall formation was observed in former years on waxmyrtle and also flameleaf sumac (Rhus copallina) on Merritt Island.

NERIUM OLEANDER, OLEANDER. Sphaeropsis sp., witches' broom, was observed on a number of ornamental bushes at Sanford, DeLand, Cocoa, City Point, Eau Gallie, Miami, and Coconut Grove. This disease is reported to have become increasingly widespread and destructive about Miami during the last few years. It characteristically appears again in the new growth that develops after infected plants are cut back severely, thus appearing to

be systemic. Witches' brooms were found to have developed in the first growth that put out in 2 of a series of cuttings being propagated at the Deering Estate.

NYSSA OGECHE, CGEECHEE TUPELO. An unidentified leaf spot was observed to be causing extensive defoliation of trees along the road between Chipley and Bonifay and in the river bottom on the Holmes-Washington County line. No disease has been reported on this tree in Florida previously. Unfortunately, the fungus was not fruiting and could not be identified.

OPUNTIA, PRICKLYPEAR. Perisporium wrightii, black spot, was observed to occur fairly commonly at Altoona, between DeLand and Orange City, and at Crlovista. In previous years the writer has found this disease occurring commonly on various species of Opuntia along the East Coast from Vero Beach north to near St. Augustine.

OSMANTHUS AMERICANUS, DEVILWOOD OSMANTHUS. Capnodium elongatum, sooty mold, was found occurring abundantly at Gainesville. Meliola sp., was of common occurrence at Gotha. The fungus has been considered to be M. amphitricha Fr. but this vague species was excluded by Stevens in his monograph of the genus. Phyllosticta sinuosa, leaf spot, was of widespread occurrence in western Florida, collections having been made 10 miles northwest of Perry and at Torreya State Park.

PERSEA HUMILIS, SILKBAY PERSEA. Phyllosticta micropuncta, leaf spot, was observed in scrub woods west of Astor Park.

PHORADENDRON FLAVESCENS, MISTLETOE. This parasitic plant was found to be of widespread and frequent occurrence throughout northern and central Florida but appears to occur infrequently in western Florida and on the lower East Coast. It extends southward in the State at least to Lake Placid and Clearwater and was recently found on Key Largo. It occurs most frequently on various oaks, including laurel, water, turkey, bluejack, and myrtle oaks, hickory, pecan, swamp black gum tupelo, and black cherry. It occurs with extreme frequency in areas of oak scrub. Mistletoe has been recorded as occurring on more than 50 species of trees and shrubs in the State. Host records have been reported in PDR 27(23):637-638, Nov. 15, 1943, and 28 (7):262-269, April 1, 1944.

Sphaeropsis visci, leaf blight, hitherto unreported for Florida, has been found to be of very common and widespread occurrence. Other fungi found on mistletoe are Septobasidium pseudopedicellatum, and Tryblidiella fusca, new host records in both cases (PDR vol. 28, p. 269).

PINUS spp., PINE. Cronartium fusiforme, southern fusiform rust, was found occurring occasionally on P. caribaea, slash pine, at points about Alachua County and in various counties in western Florida. It occurs to some extent in planted slash pine forests in Suwannee County. The disease appears to occur much less frequently on this host than on Pinus taeda or P. echinata. It was found occurring frequently in various west Florida counties on P. echinata, shortleaf pine, being especially abundant between Tallahassee and Quincy and about Quincy. It was of common occurrence on P. taeda, loblolly pine, in Alachua, Jefferson, Gadsden, Taylor and Dixie Counties. It frequently attacks young trees with great severity, often seriously deforming them.

PLEIOBLASTUS CHINO. Puccinia melanocephala, rust, was found occurring on this bamboo which had escaped from cultivation and become a veritable pest. The uredinia were extensively parasitized by Monosporium uredinicum Stevens. Meliola tenuis, black mildew, also occurred on other

plants in the same locality.

QUAMOCLIT VULGARIS, CYPRESSVINE. Coleosporium ipomoeae, rust, was found causing extensive infection on vines between Largo and Seminole.

POINSETTIA HETEROPHYLLA. Uromyces proeminens var. poinsettiae, rust, was of common occurrence on this weed at Tropic, Merritt Island.

POLYCODIUM FLORIDANUM, DEERBERRY. Pucciniastrum myrtilli, rust, was found causing slight infection on plants at Cocoa. Rhytisma vaccinii, tar spot, occurred to some extent on plants at Cocoa and in great profusion on large numbers of plants in the scrub woods at Altoona.

PRUNUS CAROLINIANA, CAROLINA LAURELCHERRY. Exudation of gum from the base of a young street tree was observed at Quincy but no cause was found. Another adjacent, similarly affected tree that had just been sawed off at the ground showed more or less concentric series of pathologic resin canals developed in the wood.

QUERCUS spp., OAK. Microsphaera alni, powdery mildew, was found on leaves of young laurel oaks, Q. laurifolia, at Gainesville, Evinston, Oak Hill, and Titusville. Oidium sp., probably the conidial stage of M. alni, was found on a young white oak tree, Q. alba, in Torreya State Park, but perithecia were lacking.

Trabutia erythrospora, tar spot, was of common occurrence on old leaves of live oak, Q. virginiana, trees at Gainesville, Melrose, and Brooksville. The fungus does not appear to develop mature spores until some time after the leaves have fallen.

Wood-rotting fungi were reported in PDR 28(7):261-262.

Conopholis americana, squaw root, was found growing from roots of laurel oak trees in Sanchez Hammock 10 miles northwest of Gainesville and at Magnesia Springs, and from roots of a water oak, Q. nigra, at the latter place.

Phoradendron flavescens, mistletoe, was observed to be common especially on laurel oak. See PDR 1. c., under Phoradendron.

RHUS COPALLINA, FLAMELEAF SUMAC. Cercospora rhuina was found to be of widespread occurrence throughout north central and central Florida, frequently causing premature shedding of the attacked leaflets.

ROSA PALUSTRIS, SWAMP ROSE. Phragmidium speciosum, rust, was found producing telia on a single stem tip in Sugarfoot Hammock west of Gainesville, where it has been observed in former years. The uredinial stage was found overwintering on persistent leaves in another locality at Gainesville.

RUBUS ? ARGUTINUS, BLACKBERRY. Irenina manca, black mildew, was abundant on plants at Altoona.

SABAL ETONIA, ETONIA PALMETTO. Myriangium sabaleos Weedon, leaf spot, was found at De Soto City. This is a new host record for this little known fungus, which appears to have been known only on cabbage palmetto, (Sabal palmetto), on which it was described from a collection made at St. Petersburg in 1923. As Miller has pointed out (*Mycologia* 32:589. 1940), this does not appear to belong to Myriangium.

SABAL PALMETTO, CABBAGE PALMETTO. Ganoderma zonatum (G. sulcatum Murr.), which occasionally attacks palms, was observed fruiting at the base of a living tree at Longwood. These species are now regarded as synonymous by Dr. Merrill, the former having priority.

SERENOA REPENS, SAW PALMETTO. Meliola palmicola, black mildew, was found to be an extremely common and widespread disease, it having been observed at many points throughout northern and central Florida.

SIDA spp., TEAWEEED. Ramularia areola, frosty mildew, was found causing widespread infection of plants of Sida carpinifolia at points about Gainesville and Citra, of S. acuta at Umatilla, and of S. rhombifolia at Bonaventure.

SMILAX AURICULATA. Capnodium elongatum, sooty mold, was found in Sanchez Hammock 10 miles northwest of Gainesville. Cercospora smilacis, leaf spot, occurred abundantly at De Soto City.

SMILAX LAURIFOLIA, LAUREL GREENBRIER. Cercospora smilacis, leaf spot, occurred abundantly 10 miles northwest of Perry. Pestalotia funerea was found associated with a leaf spot at Umatilla.

TILIA FLORIDANA, FLORIDA LINDEN. Conopholis americana, squaw-root, was found growing from roots of a tree at Magnesia Springs.

VACCINIUM ARBOREUM, FARKLEBERRY. Ophiodothella vaccinii was of common occurrence as a cause of leaf spot at Suwanee Springs, Altoona, and Eustis.

VERBESINA VIRGINICA, WHITE CROWNBEARD. Coleosporium viguierae, rust, occurred abundantly on plants near Merritt Island P. O., Merritt Island and on Hypoluxo Island.

VERNONIA OVALIFOLIA. Coleosporium vernoniae, rust, caused heavy infection of plants in Torreya State Park.

XANTHIUM AMERICANUM, COCKLEBUR. Erysiphe cichoracearum, powdery mildew, was found attacking leaves of plants near Milton, Allentown and Oak Grove at the western end of Florida, and also at Ocala. Puccinia xanthii attacked plants severely at Allentown and Oak Grove and less so at Ocala.

PLANT DISEASES OBSERVED IN ALABAMA IN 1943

G. M. Stone and J. L. Seal

VEGETABLE CROPS

ABELIOSCHUS ESCULENTUM OKRA. Leaf spots caused by Cercospora althaeina and Phyllosticta hibiscina were found scattered in most plantings, causing no apparent damage. Rootknot (Heterodera marioni) and Fusarium wilt (F. oxysporum f. vasinfectum) were of major importance and caused severe damage in a high percentage of gardens especially in the southern part of the State.

BRASSICA CLERACEA var. ACEPHALA, COLLARDS. Rootknot (Heterodera marioni) was prevalent in the southern part of the State, causing more damage than other diseases. Only scattered infections of blackleg (Phoma lingam) and ringspot (Mycosphaerella brassicicola) were observed. Black rot (Xanthomonas campestris) (Bacterium campestre) was more prevalent than blackleg but did not occur in sufficient amount to cause much damage.

BRASSICA CLERACEA var. CAPITATA, CABBAGE. Rootknot (Heterodera marioni) was of major importance, being prevalent in the southern section and causing moderate damage in many fields. Black leaf spot (Alternaria circinans)

was of minor importance; it became prevalent late in the season after most of the cabbage had been cut. Black rot (Xanthomonas campestris) and bacterial soft rot (Erwinia carotovora) were of greater importance than black leaf spot; they were destructive in occasional plantings. Only a few infections of black leg (Phoma lingam) and yellows (Fusarium oxysporum f. conglutinans) were seen. Southern blight (Sclerotium rolfsii) occurred in occasional plantings.

BRASSICA RAPA, TURNIP. Rootknot (Heterodera marioni) was the most prevalent disease and caused considerable damage to many plantings in the southern part of the State. Scattered infections, with little damage, of black rot (Xanthomonas campestris), leaf spot (Colletotrichum brassicae), and mosaic (virus), were observed.

IPOMOEA BATATAS, SWEETPOTATO. Rootknot (Heterodera marioni) was of major importance in the southern part of the State. Scurf (Monilochaetes infusans) was fairly general. In some crops a high percentage of the plants were affected, but little damage resulted. Stem rot (Fusarium oxysporum f. batatas) was generally distributed over the State but less than 1% of the plants were infected. Leaf spot (Phyllosticta batatas) was of minor importance; although it was found in most fields, no apparent damage resulted. Java black rot (Diplodia tubericola) was found occasionally in the southern part of the State. Dry rot (Diaporthe batatatis) was common in storage but losses usually were low.

LYCOPERSICON ESCULENTUM, TOMATO. Diseases of major importance were Fusarium wilt (F. oxysporum f. lycopersici), which was general and caused losses that were quite often heavy where susceptible varieties were grown, especially in home gardens, and early blight (Alternaria solani), southern blight (Sclerotium rolfsii), and mosaic (virus), all of which were more prevalent in 1943 than usual and caused moderate damage.

Bacterial wilt (Pseudomonas solanacearum) was found to cause considerable damage in quite a few plantings in the southern part of the State.

Blossom-end rot (physiogenic) was general, being found in almost every planting seen, but losses were not great.

Leaf spot (Septoria lycopersici) was rather prevalent but caused little damage.

Anthrachnose (Colletotrichum phomoides), bacterial canker (Corynebacterium michiganense), bacterial spot (Xanthomonas vesicatoria), gray mold rot (Botrytis cinerea), and stem rot (Rhizoctonia solani), were of slight importance, being found only occasionally.

PHASEOLUS VULGARIS, GREEN BEANS. Rootknot (Heterodera marioni), a root rot caused by Diaporthe sp., and southern blight (Sclerotium rolfsii), were the most important diseases, causing moderate to severe damage in many fields.

Mosaic (virus) was general, and considerably more prevalent in 1943 than usual. Damage was moderate.

Powdery mildew (Erysiphe polygoni) and rust (Uromyces phaseoli var. typica) were general, but of no consequence on the early crop. Both were more severe on the late crop.

Bacterial blight (Xanthomonas phaseoli) was not very prevalent and caused moderately low damage.

Anthrachnose (Colletotrichum lindemuthianum), bacterial wilt (Pseudomonas solanacearum), black root rot (Thielaviopsis basicola), leaf blotch (Cercospora cruenta), and stem rot (Sclerotinia sclerotiorum), were each found

in a few plantings, causing slight damage.

SCLANUM TUBEROSUM, POTATO. Early blight (Alternaria solani) was more destructive than usual and was of major importance on the early crop. Scattered infections of bacterial wilt (Pseudomonas solanacearum) and Fusarium wilt (F. oxysporum) were noted; less than 1% of the plants were affected. Scab (Actinomyces scabies) was of minor importance, as was also soft rot (Bacillus sp.) which was less prevalent than usual. Only an occasional plant affected by southern blight (Sclerotium rolfsii) was noted.

CEREALS AND FORAGE CROPS

AVENA SATIVA, OATS. Crown rust (Puccinia coronata) is of major importance on oats in Alabama. Infections in 1943 were moderate. Loose smut (Ustilago avenae) was prevalent in fields from untreated seed but losses were considerably less than those caused by crown rust.

HORDEUM VULGARE, BARLEY. A root rot caused by a species of Helminthosporium was of major importance in the "black belt" of Alabama and caused severe damage to early plantings. Both loose and covered smuts (Ustilago spp.) are prevalent in the State and rather destructive where seed treatments are not practised. Leaf spot (Helminthosporium sativum) and powdery mildew (Erysiphe graminis) were found in most fields but apparently caused little damage.

LUPINUS ANGUSTIFOLIUS, BLUE LUPINE. Both Fusarium wilt (F. oxysporum f. vasinfectum) and southern blight (Sclerotium rolfsii), which are usually of minor importance, were considerably more prevalent than usual in 1943 and caused moderate damage.

PISUM SATIVUM var. ARVENSE, AUSTRIAN WINTER PEA. Blight and root rot caused by Ascochyta sp. is the most important disease of this plant in Alabama and is often the limiting factor in growing it. In 1943 it was less severe than usual and caused moderate losses.

Downy mildew (Peronospora pisi) was less prevalent than Ascochyta blight; however, it was more severe than usual and caused moderate loss.

SOJA MAX, SOYBEAN. The most important diseases are mosaic (virus) which was more prevalent than usual, and southern blight (Sclerotium rolfsii) which occurred in the usual amounts; both caused moderate loss.

A number of diseases usually considered of minor importance were more prevalent in 1943 than usual and caused moderate damage in some plantings; these include bacterial leaf spot (Pseudomonas glycinea), downy mildew (Peronospora manshurica), and pod and stem blight (Diaporthe sojae), and also frog-eye leaf spot (Cercospora sojae) which caused less injury than the others.

SORGHUM VULGARE, SORGHUM. Leaf spot (Ascochyta sp.) was of major importance and caused severe damage in many fields. Leaf blight (Helminthosporium turcicum) and bacterial stripe (Pseudomonas andropogoni) occurred generally to a moderate extent, causing severe damage in an occasional field. Anthracnose (Colletotrichum lincola) was of minor importance, only occasional infections being noted.

TRIFOLIUM PRATENSE, RED CLOVER. Powdery mildew (Erysiphe polygoni) was more prevalent than usual, occurring generally and causing moderate damage. Anthracnose (Colletotrichum trifolii) was less prevalent than usual, only scattered infections being observed.

TRIFOLIUM REPENS, WHITE CLOVER. Rootknot (Heterodera marioni), the most important disease, caused moderate damage. Leaf spot (Cercospora sp.) was more prevalent than usual and caused slight to moderate damage. Botrytis blight (Botrytis sp.), leaf blight (Stagonospora sp.), and southern blight (Sclerotium rolfsii), were less prevalent than usual.

TRITICUM AESTIVUM, WHEAT. Leaf rust (Puccinia rubigo-vera var. tritici) is the most destructive wheat disease in Alabama. Infection in 1943 was general and moderately heavy. Loose smut (Ustilago tritici) was found in most fields but losses were low. Speckled leaf blotch (Septoria tritici) was found scattered in most fields with no apparent damage resulting. Only a slight amount of scab (Gibberella zeae) was seen in 1943.

VICIA spp., VETCH. Blight and root rot caused by Ascochyta sp. is of major importance on common vetch; however, in 1943 it was less prevalent than usual and caused only slight to moderate damage.

Red rot (cause unknown), usually of major importance on monantha vetch, was less severe than usual, with slight to moderate damage.

VIGNA SINENSIS, COWPEA. Rootknot (Heterodera marioni), southern blight (Sclerotium rolfsii) and Fusarium wilt (F. oxysporum f. tracheiphilum), were found frequently on susceptible varieties in the southern part of the State. Powdery mildew (Erysiphe polygoni) was considerably more prevalent than usual, especially late in the season, and late crops were damaged materially. Scattered infections, causing little damage, of bacterial spot (Pseudomonas syringae) and Cercospora spot (C. cruenta), were noted.

ZEA MAYS, CORN. Dry rot (Diplodia zeae) and Fusarium ear rot (F. moniliforme) were more prevalent than usual. Smut (Ustilago maydis) was found in most fields but less than 1% of the plants were affected. Infection by brown spot (Physoderma zeae-maydis) was heavier in 1943 than usual but damage was considered slight. Leaf blight (Helminthosporium turcicum) occurred in scattered infections causing little damage.

FRUIT CROPS

FRAGARIA, STRAWBERRY. The stem nematode, Ditylenchus dipsaci, and the rootknot nematode, Heterodera marioni, were of major importance. Apparently the stem nematode caused greater damage.

Scattered infections by angular spot (Dendrophoma obscurans), leaf spot (Mycosphaerella fragariae), and powdery mildew (Sphaerotheca humuli) occurred in most plantings, apparently causing no damage.

Crown rot (Pellicularia filamentosa) (Corticium vagum) was observed occasionally.

Of the fruit rots, leak (Rhizopus nigricans), was of major importance and caused moderate to heavy losses, especially with poor handling. Brown rot (Rhizoctonia) and gray mold rot (Botrytis cinerea) were noted in occasional infections.

SPECIAL CROPS

ARACHIS HYPOGAEA, PEANUT. Bacterial wilt (Pseudomonas solanaccarum) occurred in scattered infections in the southern part of the State and was of only slight importance.

Cercospora leaf spot (C. personata and C. arachidicola) was general over the State. It caused little to no damage in the new peanut-growing areas of the northern part of the State. Infection was much heavier in the "Old Belt", especially when the crop was grown in the same field for the second year.. About 10 to 15% loss was caused in the "Old Belt".

Southern blight (Sclerotium rolfsii) was prevalent in the "Old Belt". A high percentage of the plants were infected in many fields but total damage is considered not to be so great as from Cercospora.

GOSSYPIMUM, COTTON. Damping-off (seedling diseases) were of major importance although much less abundant this year than usual.

Rootknot (Heterodera marioni) was more prevalent on the sandy soils of southern sections where it is the most important disease.

Fusarium wilt (F. oxysporum f. vasinfectum) was much more prevalent in 1943 than in 1942 and also more prevalent than in the average year.

Blight (Ascochyta gossypii) was considerably more prevalent in 1943 than usual but this disease is considered to be of minor importance.

Angular leaf spot (Xanthomonas malvacearum) was observed in general, but very light infections. Anthracnose (Glomerella gossypii) was found only occasionally. Sparse infections of leaf spot (Alternaria sp.) were noted, with no apparent damage.

SACCHARUM, SUGARCANE. Mosaic (virus) was of major importance. A high percentage of the plants were diseased in susceptible varieties.

Red rot (Colletotrichum falcatum) was of minor importance but caused heavy losses in occasional banks.

LIST OF PLANT DISEASES OBSERVED DURING SURVEYS IN MISSISSIPPI AND LOUISIANA, AUGUST TO NOVEMBER, 1943

L. H. Person

VEGETABLE CROPS

ABELMOSCHUS ESCULENTUS, OKRA. Heterodera marioni, rootknot: Miss.

ALLIUM spp. The following diseases occurred in Louisiana:

A. ASCALONICUM, SHALLOT. Phoma terrestris, pink root; Sclerotium cepivorum, white rot; stunting and yellowing, probable virus.

A. CEPA, ONION. Peronospora destructor, downy mildew; Stemphylium botryosum (Macrosporium parasiticum), stalk rot.

A. SATIVUM, GARLIC. Sclerotium cepivorum, white rot.

BRASSICA OLERACEA var. BOTRYTIS, BROCCOLI. Alternaria circinans (A. brassicae), leaf spot: La. Xanthomonas campestris, black rot: La. B. OLERACEA var. CAPITATA, CABBAGE. Alternaria circinans, leaf spot: La., Miss. Peronospora parasitica, downy mildew: La. Sclerotinia sclerotiorum, watery soft rot: La. Xanthomonas campestris, black rot: La.

CAPSICUM FRUTESCENS, PEPPER. Southern wilt was noted in both States; the other reports are for La. Cercospora capsici, leaf spot; Colletotrichum nigrum, anthracnose; Fusarium annuum, wilt; Gloeosporium piperatum, anthracnose; Sclerotium rolfsii, southern wilt;

- Pseudomonas solanacearum, bacterial wilt; Xanthomonas vesicatoria, bacterial spot; mosaic (virus).
- CITRULLUS VULGARIS, WATERMELON. Alternaria cucumerina (Macrosporium cucumerinum), leaf blight: La. Fusarium oxysporum f. niveum, wilt: La., Miss.
- CUCUMIS SATIVUS, CUCUMBER. Pseudoperonospora cubensis, downy mildew: La. Pythium sp., cottony leak: La.
- IPOMOEA BATATAS, SWEETPOTATO. Actinomyces ipomoea, soil rot: La. Diplodia tubericola, Java black rot: La. Endoconidiophora (Ceratostomella) fimbriata: La. Fusarium oxysporum f. batatas, stem rot and wilt: both States. Heterodera marioni, rootknot: Miss. Monilochaetes infuscans, scurf: La. Phyllosticta batatas, leaf spot: both States. Rhizopus nigricans, soft rot: both States. Sclerotium bataticola, charcoal rot: La. S. rolfsii, stem rot in the plantbed: La. Septoria bataticola, leaf spot: both States.
- LYCOPERSICON ESCULENTUM, TOMATO. Alternaria solani, early blight and nailhead spot: La. Corynebacterium michiganense, bacterial canker: La. Fusarium oxysporum f. lycopersici, wilt: La. Heterodera marioni, rootknot: La. Pseudomonas solanacearum, bacterial wilt: both States. Sclerotium rolfsii, southern wilt: both States. Mosaic (virus): La. Blossom-end rot (physiogenic): Miss.
- PHASEOLUS LUNATUS, LIMA BEAN. Diaporthe phaseolorum, pod blight, and Sclerotium rolfsii southern wilt: both in Miss.
- P. VULGARIS, BEAN. Macrophomina phaseoli, ashy stem blight: Miss. Pythium sp., stem tip blight: Miss. Rhizoctonia microsclerotia, web blight; both States. Rhizoctonia solani: La. (stem canker), Miss. (root rot). Sclerotium bataticola, charcoal stem blight: La. S. rolfsii, southern wilt: both States. Uromyces phaseoli var. typica, rust: both States. Pseudomonas medicaginis var. phaseolicola, halo blight, and Xanthomonas phaseoli, common bacterial blight: both States. Mosaic (virus): La. (on leaf and pod), Miss.
- PISUM SATIVUM, PEA. Ascochyta pisi, blight, and Erysiphe polygoni, powdery mildew: both in La.
- SCIANUM MELONGENA, EGGPLANT. Phomopsis vexans, fruit rot: La. Sclerotium rolfsii, southern wilt: both States. Pseudomonas solanacearum, bacterial wilt: La.
- S. TUBEROSUM, POTATO. Actinomyces scabies, scab: La. Alternaria solani, early blight: La. Phytophthora infestans, late blight: La. Pythium sp., tuber rot: La. Sclerotium rolfsii: La. (tuber rot), Miss. (southern wilt). Corynebacterium sepedonicum, bacterial ringrot: La. Pseudomonas solanacearum, bacterial wilt: La. Virus diseases: mosaic in Miss., mild and rugose mosaic, leaf roll, spindle tuber in La. Haywire (undet.): La.

CEREALS, GRASSES, AND FORAGE CROPS

- AXONOPUS COMPRESSUS, CARPET GRASS. Physarum cinereum, slime mold: Miss.
- MEDICAGO ARABICA, BURR CLOVER. Colletotrichum destructivum, anthracnose, and C. trifolii, anthracnose: La.
- M. SATIVA, ALFALFA. Pleospora herbarum, leaf spot, and Uromyces striatus, rust: La.

- MELILOTUS INDICA, SOUR CLOVER. Colletotrichum trifolii, anthracnose, and Entyloma meliloti, white smut: La.
- ORYZA SATIVA, RICE. The following diseases were observed in La.: Cercospora oryzae, leaf spot; Entyloma oryzae, leaf smut; Helminthosporium oryzae, brown spot; Hypochnus sasakii, banded sclerotial disease; Leptosphaeri salvinii, stem rot; Piricularia oryzae, blast; Rhizoctonia oryzae, sheath spot; white tip (undet.).
- SOJA MAX, SOYBEAN. Except where indicated, these diseases were noted in both States. Cercospora sojae (C. daizu), leaf spot: La. Diaporthe sojae, pod and stem blight. Sclerotium bataticola, charcoal rot. S. rolfsii, southern wilt. Pseudomonas glycinea, bacterial blight. Xanthomonas phaseoli var. sojense, bacterial pustule. Mosaic (virus): La.
- SORGHUM VULGARE, SORGHUM. Except where indicated diseases were observed in both States. Ascochyta sorghina, leaf spot: Miss. Cercospora sorghi, leaf spot. Colletotrichum graminicolum, anthracnose. Gloeocercospora sorghi, zonate leaf spot. Puccinia purpurea, rust: La. Titaeospora andropogonis, sooty stripe. Pseudomonas andropogoni, bacterial stripe.
- TRIFOLIUM DUBIUM, HOP CLOVER. Erysiphe polygoni, powdery mildew: La.
- T. PRATENSE, RED CLOVER. Powdery mildew: La.
- T. REPENS, WHITE CLOVER. Cercospora zebrina, leaf spot; Cymadothea trifolii, sooty blotch; and Pseudoplea trifolii, leaf spot: La.
- VICIA FABAE, BROAD BEAN. Uromyces fabae, rust; and boron deficiency: La.
- V. VILLOSA, VETCH. Ascochyta pisi, leaf spot; Colletotrichum sp., anthracnose; and Peronospora viciae, downy mildew: La.
- VIGNA SINENSIS, COWPEA. Cercospora vignae, leaf spot: La. Fusarium oxysporum f. tracheiphilum, wilt: La. Macrophomina phaseoli, stem canker: La. Rhizoctonia solani, stem canker: La. Sclerotium rolfsii, southern wilt: Miss. Mosaic (virus): Miss.
- ZEA MAYS, CORN. Fusarium moniliforme: La. (ear rot), Miss. (stalk rot). Helminthosporium sp., leaf spot: Miss. Physoderma zeae-maydis, brown spot: both States. Puccinia sorghi, rust: La. Rhizoctonia solani, damping-off: Miss. Ustilago maydis, smut: both States. Mosaic (virus): La.

FRUIT AND NUT CROPS

- ALEURITES FORDII, TUNG TREE. Rhizoctonia microsclerotia, web blight: Miss.
- CARYA ILLINOENSIS, PECAN. Cercospora fusca, brown spot: both States. Cladosporium effusum, scab: both States. Gnomonia nerviseda, vein spot: Miss. Bunch (virus): La.
- CITRUS NOBILIS UNSHIU, SATSUMA ORANGE. Sphaceloma fawcettii, scab: La.
- C. PARADISI, GRAPEFRUIT. Sphaceloma fawcettii, scab: La.
- C. SINENSIS, ORANGE. Diaporthe citri, melanose: La.
- FICUS CARICA, FIG. Macrophoma fici, canker: Miss.
- The following diseases were noted in La.: Cephalosporium sp., leaf spot; Corticium sp., leaf blight; C. salmonicolor, twig blight; Pellicularia filamentosa (Corticium microsclerotia), leaf blight; P. koleroga (C. stevensii), twig and leaf blight; Physopella fici, rust.

FORTUNELLA JAPONICA, KUMQUAT. Diaporthe citri, melanose: Miss.

FRAGARIA, STRAWBERRY. The following diseases were observed in La.:
Botrytis cinerea, gray mold; Diplocarpon earliana, leaf scorch; Mycosphaerella fragariae, leaf spot; M. louisianae, purple leaf spot; and Aphelenchoides fragariae, dwarf.

MORUS sp., MULBERRY. Sclerotinia carunculoides, popcorn disease: Miss.

PYRUS COMMUNIS, PEAR. Armillaria mellea, root rot: Miss. Cercospora minima, leaf spot: both States. Clitocybe tabescens, foot rot: La. Corticium salmonicolor, twig blight: Miss. Fabraea maculata, leaf spot: both States. Septobasidium mariana, felted fungus: Miss. Erwinia amylovora, fireblight: both States. Heterodera marioni, rootknot: Miss.

VITIS spp., GRAPE AND MUSCADINE. Guignardia bidwellii, black rot; and Rhizoctonia solani: Miss.

SPECIAL CROPS

ARACHIS HYPOGAEA, PEANUT. Cercospora personata, leaf spot; and Sclerotium rolfsii, southern wilt: both States.

GOSSYPIUM, COTTON. Fusarium oxysporum f. vasinfectum, wilt; and Xanthomonas malvacearum, anthur leaf spot, were reported in both States. Verticillium albo-atrum, wilt, was observed in Miss. The following diseases were noted in La.: Cercospora gossypina, leaf spot; Diplodia gossypina, boll rot; Fusarium moniliforme, seedling rot; Glomerella gossypii, anthracnose; Rhizoctonia solani, damping-off; Heterodera marioni, rootknot; crinkle-leaf associated with high soil acidity and manganese toxicity; and rust due to potassium deficiency.

SACCHARUM, SUGARCANE. The following diseases were noted in La.:
Colletotrichum falcatum, red rot; Cytospora sacchari, sheath rot; Fusarium moniliforme, pokkah-boeng; Pythium sp., root rot; Sclerotium rolfsii, sheath rot; the virus diseases chlorotic streak and mosaic; and multiple bud of undetermined cause.

TREES AND ORNAMENTALS

CRATAEGUS sp. Gymnosporangium globosum, rust: Miss.

GLADIOLUS. Fusarium sp., bulb rot; Pseudomonas marginata, stem rot; and Heterodera marioni, rootknot: Miss.

IRIS. Mosaic (virus): Miss.

LAGERSTROEMIA INDICA, Crape Myrtle. Uncinula australiana, powdery mildew: Miss.

LIGUSTRUM sp., PRIVET. Microsphaera alni, powdery mildew: Miss.

MAGNOLIA GRANDIFLORA. Meliola amphitricha, sooty blotch: Miss.

PHLOX. Erysiphe cichoracearum, powdery mildew: Miss.

PINUS TAEDA, LOBLOLLY PINE. Systema acicola, brown spot: Miss.

POPULUS sp., POPLAR. Melampsora sp., rust: Miss.

RHODODENDRON sp., AZALEA. Exobasidium azaleae, hypertrophy: Miss. Ovulinia azaleae, flower spot: La.

ROSA. Sphaerotheca pannosa, powdery mildew: Miss.

SUMMARY REPORT OF PLANT DISEASES IN ARKANSAS, 1943

Howard W. Larsh with assistance of Arkansas State
Plant Pathologists and crop Specialists.

The 1943 season in Arkansas was abnormal in many respects, as seen in the following climatological data (U. S. Department of Commerce, Weather Bureau. Climatological Data, Arkansas Division Vol. 48 No. 13, Walter C. Hickmon):

	<u>Mean temp.</u>	<u>Departure from long-time average</u>	<u>Mean precipitation</u>	<u>Departure from long-time average</u>
Jan.	41.8	+0.6	1.00	-3.31
Feb.	47.5	+3.9	1.00	-2.36
Mar.	46.9	-5.6	5.66	+1.04
April	62.9	+1.4	3.20	-1.73
May	71.0	+1.8	7.89	+2.95
June	79.8	+2.7	2.86	-1.19
July	82.9	+2.3	1.13	-2.59
Aug.	84.6	+4.5	1.03	-2.53
Sept.	70.4	-3.9	3.23	-0.08
Oct.	61.3	-1.5	3.48	+0.27

According to Dr. V. H. Young, the climatological conditions that prevailed during this year produced clear-cut examples of the effect of weather on diseases, and the major facts regarding parasitic and non-parasitic diseases were determined by the adverse weather conditions.

Severe freezes during early March nearly destroyed the Elberta peach crop. Estimations of losses, in commercial orchards, resulting from these freezes range from 50 to 75%. Spinach plantings were also injured by the freezes of March. A reduction in the strawberry crop resulted from the low temperatures that prevailed near the middle of April. During the latter part of April and early May the moisture in the soil began to be depleted thus hindering the germination of seeds and growth of crops; dry weather further injured the spinach and strawberry crops and greatly delayed the planting of corn, cotton, peanuts, and other truck crops. The development and dissemination of fungi were also hindered during this period, this was especially true of "blue mold" of spinach. In early May (8-11) torrential rains brought the moisture curve to a very steep peak, causing floods, poor stands in various crops, and still more delay in the planting of other crops. The usual procedure of spraying apples, grapes, and peaches was impossible because of soft ground. Rainfall then declined rapidly and almost no rain fell until late in the fall, resulting in one of the most serious droughts in the recent history of the State.

The months of June, July, and August were extremely dry, and hot weather persisted causing various crops to deteriorate. In August the precipitation was less than 30% of normal. Cotton opened prematurely; corn and other crops showed signs of burning due to the extreme drought.

Late maturing crops benefited from the cool days in September and October but fall planted cereals made poor growth. The precipitation during these 2 months was nearly normal.

VEGETABLE CROPS

CAPSICUM ANNUUM, PEPPER. Fruit spot (Alternaria sp.) was prevalent in pepper plantings during 1943. In most of the large plantings a loss of nearly 10% could be attributed to this disease. Many secondary organisms entered the Alternaria lesions, causing further decomposition of the fruit.

Wilted pepper plants collected in the vicinity of Van Buren, revealed a Fusarium upon culturing. A loss of nearly 5% of the plants to this infection was estimated.

Southern blight (Sclerotium rolfsii) was found in several plantings throughout the State during 1943. In 2 plantings a loss of nearly 10% could be attributed to this disease.

Verticillium wilt (Verticillium albo-atrum) was the most widespread disease of pepper in Arkansas during 1943. Affected fields were observed in several localities in which the causal organism was Verticillium albo-atrum. Losses due to this disease fluctuated from a trace in some plantings to 35% in the most severely affected field.

CITRULLUS VULGARIS, WATERMELON. Fruits affected by anthracnose (Colletotrichum lagenarium) were found in two or three plantings in the State. In one planting a loss of nearly 5% could be attributed to this disease.

Blossom-end rot (non-parasitic) was found without any trouble in all of the plantings surveyed. Commercial plantings as well as home garden plantings were infected and many fruits were lost. Many secondary organisms, such as Rhizopus, Penicillium, Aspergillus, etc., were observed in the primary injury caused by blossom end rot.

Wilt (Fusarium oxysporum f. niveum) (F. bulbigenum var. niveum) was observed in but a single planting in Arkansas during the 1943 season. In this particular planting a susceptible variety was seeded. The loss, however, was less than 5% in a planting of 125 acres.

CUCUMIS MELO, CANTALOUPE. Leaf blight (Alternaria cucumerina) (Macrosporium cucumerinum) was present in all of the plantings surveyed. While it probably was the most serious disease of cantaloupe seen during the past season, the extent of injury was very light as the extreme drought prevented the spread of the disease, although the primary infection was widespread. The most severely attacked planting had a loss of over 15% of the foliage due to necrotic areas.

Downy mildew (Pseudoperonospora cubensis) was found on the older leaves of a few plants but was causing very little injury. Early infections were observed in 2 plantings but due to the adverse weather conditions the primary infections failed to develop further.

Bacterial wilt (Erwinia tracheiphila), as observed during 1943, was limited to 3 plants in a small planting of less than an acre.

IPOMOEA BATATAS, SWEETPOTATO. Black rot (Endoconidiophora (Ceratostomella) fimbriata) of sweetpotatoes was observed in only 3 plantings in southern Arkansas. The loss in each of these plantings was less than 1%.

The most prevalent and widespread disease of sweetpotato in Arkansas during the 1943 season was Fusarium stem rot, (Fusarium oxysporum f. bata-tas) (F. bulbigenum var. batatatis). In commercial plantings the losses fluctuated from a trace up to 15%. In one small home planting a loss of nearly 40% was observed.

A loss of 10% was attributed to leaf spot (Phyllosticta batatas) in one planting consisting of 75 acres. Most of the plants in this planting were infected.

LYCOPERSICON ESCULENTUM, TOMATO. (Fusarium oxysporum f. lycopersici) (F. bulbigenum var. lycopersici) was found to be fairly widespread in the State, causing losses fluctuating from 10 to 25%.

Leaf spot (Septoria lycopersici) was present in most of the plantings surveyed, especially in the northwestern part of the State. Severe defoliation occurred in the early part of the season; however, owing to the adverse summer weather conditions, late infections were prevented.

Rootknot (Heterodera marioni) was found in several plantings in northwestern Arkansas, the loss in this area ranging from 2 up to 20%. In a commercial planting near Summers rootknot nematode affected 20% of the plants in a 50-acre planting.

Tomato mosaic (virus) was widespread in Arkansas but caused very little damage. In all of the plantings examined but one, infection was limited to only a few plants. In the most severely attacked planting 22 plants were infected with mosaic in a 2-acre planting.

Drouth injury and sun scald (non-parasitic) were the cause of the great losses to the tomato industry in Arkansas during the 1943 season. In some fields sun scald was much more abundant than blossom-end rot and resulted in discarding fully 50% of the picking. (H. R. Rosen).

Blossom-end rot (non-parasitic) was extremely prevalent and widespread during the 1943 season in Arkansas. Examples of this condition were found in nearly every planting surveyed. In some fields as much as 25 to 35% of the picking had to be discarded due to blossom-end rot.

PHASEOLUS VULGARIS, BEAN. Anthracnose (Colletotrichum lindemuthianum) was very prevalent on the first snap bean crop where Michigan-grown seed was planted. Losses of from 75 to 100% of the crop were not at all uncommon. No losses were observed in those plantings in which the seed used was western-grown. (J. R. Shay)

Leaf spot (Cercospora sp. presumably cruenta) was observed in 2 or 3 plantings. Very little loss resulted from these infections other than a slight reduction in the leaf area.

Powdery mildew (Erysiphe polygoni), which has frequently been serious on the late bean crop, was not reported this year, possibly because there was almost no late crop owing to dry weather. (V. H. Young).

Wilted bean plants (Fusarium sp.) was observed in 2 plantings in northern Arkansas. The amount of loss due to these infections was less than 1%, although wilted plants were not difficult to find in either planting.

Several dead plants revealed sclerotia of Sclerotium bataticola, however, none of the plants was lodged.

Bean rust (Uromyces phaseoli var. typica) (U. appendiculatus) was seen in a garden in Fayetteville on climbing beans. It was apparently of no importance during the 1943 season. (V. H. Young)

A 100% bean mosaic (virus) infection was observed in a 40-acre planting in southwest Arkansas during the past season.

SOLANUM MELONGENA, EGGPLANT. Wilted plants were collected from 2 plantings during the past season and Fusarium was isolated from their vascular systems. In the most severe case a loss of nearly 15% of the plants resulted in a 3 1/2 acre planting. Southern blight (Sclerotium rolfsii) was observed causing a loss of nearly 15% in one planting.

CEREALS AND FORAGE CROPS

MEDICAGO SATIVA, ALFALFA. Leaf spot (Pseudopeziza medicaginis) was difficult to locate. Specimens were found in plantings in northeastern Arkansas; however, very little loss resulted from these infections.

Rust (Uromyces striatus var. medicaginis) was observed in several plantings in northeastern and southwestern Arkansas. In the planting most severely attacked a loss of 5 to 10% was observed.

ORYZA SATIVA, RICE. Cercospora leaf spot (Cercospora oryzae), was the most prevalent and widespread leaf spot on rice in Arkansas during the 1943 season. Injury to affected plants was confined primarily to the reduction of leaf area. A marked difference in varietal susceptibility of the varieties grown commercially in Arkansas was observed. In 2 or 3 plantings of Blue Rose and Zenith varieties losses of 40 to 60% of the photosynthetic area were attributed to this leaf spot. Mira and Arkansas Fortuna varieties were resistant.

Leaf smut (Entyloma oryzae) was not very prevalent during 1943 in Arkansas; however in one planting a loss of nearly 1% could be attributed to this disease. Kamrose, Prolific, and Zenith varieties were observed affected by leaf smut.

Brown spot (Helminthosporium oryzae) was found in most of the plantings surveyed. In most instances, however, only a few spots were apparent on the leaves and glumes. The amount of damage in most plantings was negligible. In plantings in new rice areas where susceptible varieties were seeded moderate infections with losses from 3 to 5% were observed. The greatest loss was observed where black rice infected with brown spot contaminated a planting of the variety Prolific.

Stem rot (Leptosphaeria salvinii) was not very serious in most of the plantings; however, in 2 plantings, in fields that had been seeded to rice for 3 or 4 years in succession, losses of nearly 5% were observed. In several crosses in the nursery plantings in Arkansas losses were greater than 10%.

Blast (Piricularia oryzae) was limited to plantings in new rice land and where susceptible varieties were seeded. Losses of nearly 20% were observed in areas where rice had been planted for the first time. Three varieties, Prolific, Blue Rose, and Lady Wright, were observed with typical symptoms on the leaves and heads.

White tip (non-infectious) is still prevalent in the rice growing regions of Arkansas; although most of the rice growers are planting varieties that are less susceptible to this condition. One field of the variety Blue Rose revealed white tip to such a degree that a loss of 10% was estimated.

Straighthead (non-infectious) was one of the most serious maladies of rice

in Arkansas during the 1943 season. In 2 plantings nearly 50% of the estimated yield was lost due to this condition.

Sun scald (non-infectious) was observed in 2 large plantings during the 1943 season. The characteristic symptom, white heads devoid of kernels, was observed with an estimated loss of nearly 50% in each of the plantings.

SOJA MAX, SOYBEAN. Frog-eye leaf spot (*Cercospora sojina*) was found in 3 plantings and present only as a few spots in each instance, and the amount of loss was negligible.

Pod and stem blight (*Diaporthe phaseoli* var. *sojae*) was widespread in Arkansas during 1943, and considerable damage was done in certain plantings. A loss of nearly 2% could be attributed to this fungus in 3 of the affected plantings.

Loss due to wilt (*Fusarium oxysporum* f. *tracheiphilum*) (*F. bulbigenum* var. *tracheiphilum*) never exceeded 1%, although it was not difficult to locate wilted plants in several of the plantings surveyed.

Anthrachnose (*Glomorella glycines*) was observed causing slight damage to nursery plantings, but the disease was observed in only a single commercial planting where the loss was negligible.

Downy mildew (*Peronospora manshurica*) was found on a few leaves in 2 plantings during the past season. Very little loss could be attributed to this disease as only a few leaves were found infected within a single variety.

Lodging due to charcoal rot (*Sclerotium bataticola*) was observed on early maturing varieties. In no instance, however, was the loss greater than 1%. Late-maturing varieties were showing symptoms of charcoal rot but lodging had not occurred at the time of the last survey of the season.

Infections of bacterial blight (*Pseudomonas glycines*) were observed during the 1943 season. In many plantings moderate to severe defoliation occurred as a result of blight infections in combination with the pustule disease. In degree of distribution and prevalence, blight was less than the bacterial pustule disease in Arkansas during the 1943 season.

Bacterial pustule (*Xanthomonas phaseoli* var. *sojense*) was the most widespread and prevalent disease of soybean in Arkansas during the 1943 season. In 3 or 4 plantings severe defoliation resulted. There was very little difference in susceptibility of the various varieties grown commercially in Arkansas, although onelate planting of the variety Ogden was relatively free from the disease.

In nursery plantings throughout the State large numbers of plants of several varieties were attacked by mosaic (virus). In one variety in the nursery planting at Clarksdale, all of the plants were attacked. Affected soybean plants were observed in most of the commercial plantings surveyed; however, the loss was negligible.

SORGHUM VULGARE, SORGHUM. Milo disease (*Pythium arrhenomanes*) was observed in several plantings, but causing no loss greater than 1%. Susceptible varieties were grown in all of the plantings where loss was sustained.

Covered kernel smut (*Sphacelotheca sorghi*), as observed in 1943, was limited to 2 plantings and was very sparse in development. In one of the plantings a loss of less than 1% could be attributed to it. Only a few heads were found infected in the other plantings.

Bacterial spot (*Pseudomonas syringae*) and bacterial streak (*Xanthomonas*

holcicola), were observed in nearly all of the plantings surveyed. The amount of damage inflicted by these bacterial diseases was negligible, although in some plantings they were widespread. Lodging due to the charcoal rot fungus (Sclerotium bataticola) was observed in early maturing varieties. A loss of less than 2% could be attributed to this fungus. Most of the sorghum, however, had been planted since the early floods and had not matured at the time of the last survey of the 1943 season.

VIGNA SINENSIS, COWPEA. Leaf spot (Cercospora cruenta) was prevalent and widespread during the 1943 season in Arkansas. In most of the plantings moderate to severe infections were observed. In one planting the photosynthetic surface was reduced nearly 60%. Severe defoliation occurred on the variety Big Blackeye early in the season; however, in most of the plantings defoliation was too late to cause a great deal of loss.

Wilt (Fusarium oxysporum f. tracheiphilum) (F. bulbigenum var. tracheiphilum) was observed in 3 plantings where susceptible varieties had been seeded. Losses in these plantings were estimated at nearly 3%.

Charcoal rot or lodging (Macrophomina phaseoli). The pycnidial stage, Macrophomina phaseoli, was very prevalent on cowpeas during the 1943 season. The only variety to show any apparent resistance to the disease was the variety Iron. Considerable loss resulted from the infections due to this fungus, in commercial plantings up to 5% and in small variety plantings in nurseries as high as 30%.

Bacterial canker (Pseudomonas syringae)¹ was observed in 4 areas during 1943. Losses fluctuated from a trace up to 5%. In none of the areas was infection as severe as that observed in Oklahoma.

Leaf and pod blight (Xanthomonas phaseoli) [? Pseudomonas syringae]² was limited to a few plants in 2 plantings; the loss was negligible.

Plants infected with mosaic (virus) were observed in one small planting. Very little loss resulted.

ZEAL MAYS, FIELD CORN. Ear rots (Diplodia zeae, Fusarium moniliforme, and Gibberella sp.), were found in some degree in all of the plantings surveyed. Losses varied from a trace in some plantings to 2 or 3% in the most severely attacked plantings. Diplodia and Fusarium infections were found in plantings scattered throughout the State; whereas Gibberella was observed in the area near Clarksdale. Examples of stalk rot caused by Diplodia zeae were observed late in the 1943 season at Fayetteville.

Leaf spot (Helminthosporium turcicum) was found quite frequently during the 1943 season. The amount of damage was negligible in all of the infected plantings.

A leaf spot infection was observed in which the associated Helmintho-

¹ [Burkholder describes the organism causing a similar disease of cowpeas in Texas as Xanthomonas vignicola n. sp. (Phytopath. 34: 430-432. Apr. 1944). See also Hoffmaster (Phytopath. 34: 439-441. Apr. 1944)].

² [Burkholder (l. c.) states that he has not been able to obtain infection of cowpeas in inoculations with X. phaseoli].

sporium sp. did not resemble closely the species usually reported attacking corn.

Root injury (Pythium sp.), resembling very closely the symptoms characteristic of the milo disease of sorghum, was observed causing losses in 3 or 4 plantings.

Brown spot (Physoderma zeae-maydis) was observed in all of plantings surveyed in the southern section of the State. In various plantings a reduction in leaf area up to 5% could be attributed to the causal fungus.

Corn rust (Puccinia sorghi) was not severe and was more or less limited in its distribution during 1943. Infections were observed in northwestern Arkansas where the extent of damage was very slight. In no instance was the leaf area reduced more than 1%.

Corn smut (Ustilago maydis) (U. zeae) was general in its distribution throughout each planting. The extent of the injury fluctuated very little in the fields observed, infection usually resulting in a loss of approximately 5%.

Charcoal rot (Sclerotium bataticola) was present and observed in some degree in all plantings surveyed, especially in early maturing plantings. Losses fluctuated from 1 to 10%. Characteristic infection of bacterial wilt (Bacterium stewartii) was found in one planting during 1943. The damage was less than 1%. The insect vector was present in large numbers in this planting.

FRUIT CROPS

AMYGDALUS PERSICA, PEACH. Peach scab (Cladosporium carpophilum). As a result of the late severe freeze (March 3) in Arkansas very few peach fruits of the early varieties were set. Therefore, an extensive estimation of the loss due to scab on the varieties could not be determined. Foliage infections were quite prevalent throughout the State with the exception of well-sprayed orchards in the Crowley Ridge area. Fruits on late maturing varieties afforded a good source of examples of peach scab. A loss of nearly 2% of the fruit in orchards near Hope could be attributed to scab; however, only the primary stages of the disease were apparent, no cracking or coalescing of the spots on the fruit being evident. In the experimental orchards at Hope most of the fruits were attacked by the scab fungus and showed primary and secondary stages of the disease.

Brown rot (Monilinia (Sclerotinia) fructicola) was prevalent on fruits still clinging to the trees at Hope, and the mummies present on the trees as well as on the ground revealed that infection in this region had been fairly heavy. Indications of brown rot were present in the large orchards on Crowley's Ridge; however, the marketable fruit had been harvested.

Bacterial spot (Xanthomonas pruni) was one of the most common diseases of peach during the past season. Most of the trees in the severely infected areas were defoliated to the extent that 9/10 of their leaves had dropped. Fruit infections were apparent in several regions of the State.

FRAGARIA spp., STRAWBERRY. Drought injury was the cause of severe losses of strawberry plants in most of the strawberry plantings in the State. A loss of nearly 100% of the plants in several plantings in White County was observed.

Examples of leaf scorch (Dendrophoma obscurans) were observed in 2 plantings in White County. The amount of damage done by these infections was negligible.

Leaf spot (Mycosphaerella fragariae) was prevalent in two or three plantings in White County. A loss of 10% of the leaf area, due to necrotic spots, was observed. Only a few plants were observed and collected revealing characteristic symptoms and signs of the red-stele disease (Phytophthora fragariae). The infections were limited to 2 small garden plantings and the disease was not found in the commercial plant-growing area of the State.

MALUS SYLVESTRIS, APPLE. Sooty blotch (Gloeodes pomigena) was present in several orchards observed during the past season. Very little damage resulted from these infections other than as a grading factor.

The most serious outbreak of apple cedar rust (Gymnosporangium juniperi-virginianae), was observed in northwest Arkansas, where an orchard of over 40 acres showed a foliage infection of 20%. Fruit infection was apparent on approximately 2% of the fruits. Light to moderate defoliation was observed in one orchard in northwest Arkansas.

Fly speck (Leptothyrium pomi) was apparent in orchards in northwest Arkansas. Very little loss could be attributed to this disease, although examples could be located without too much difficulty. In neglected orchards infection was comparable in extent to that usual for sooty blotch.

Apple blotch (Phyllosticta solitaria) was severe on early maturing susceptible varieties not properly sprayed. The foliage of Yellow Transparent variety was heavily infected. Observation of blotch on fruit of susceptible varieties was limited to a few fruits. Dry, hot weather reduced the infections on late maturing varieties; however, blotch was found on several susceptible varieties causing a loss of nearly 2%.

Black rot (Physalospora obtusa) was one of the most serious diseases of unsprayed apples observed in Arkansas during the 1943 season. In such orchards losses of 5 to 15% were estimated. Characteristic frog-eye leaf spots were apparent in most of the orchards surveyed, as well as fruit and twig infections.

Brown rot (Monilinia (Sclerotinia) fructicola), in most instances, was associated with injury to the fruit, either mechanical or insect injury. Loss was negligible.

Apple scab (Venturia inaequalis) was still noticeable in well-sprayed orchards throughout the State; however, losses of less than 5% were estimated. Infections fluctuated from a trace to 20%.

Fireblight (Erwinia amylovora) was light in most of the regions surveyed. In one locality the infection could be considered moderate.

PRUNUS spp., CHERRY. Leaf spot (Coccomyces hiemalis) was the only disease observed on cherries in Arkansas during the 1943 season. The extent of the loss was less than 5%. In one orchard in northwest Arkansas slight defoliation resulted.

RUBUS spp., CANE FRUITS. Anthracnose (Elsinoë veneta) was well established in plantings scattered throughout the blackberry-growing region of the State. The most severe infections were located in the northwest section. The losses fluctuated from 5 to 10% in most of the plantings.

Orange rust (Gymnoconia peckiana) is one of our most serious blackberry

diseases which causes moderate losses but is not in evidence late in the season. It was very prevalent early in the 1943 growing season. (V. H. Young).

Leaf spot (Septoria rubi) was severe enough in many plantings to cause moderate defoliation. In 2 plantings a loss of nearly 15% of the foliage area resulted.

VITIS spp., GRAPE. Black rot (Guignardia bidwellii) was of considerable importance. Weather conditions in May and early June favored it and continued rains prevented proper timing of sprays. The situation would have been much worse if normal rainfall had continued into July. (V. H. Young).

In several of the plantings scattered throughout the grape growing region, black rot infections were not at all uncommon. Leaf and fruit infections were observed in nearly all of the plantings surveyed. Estimated losses ranged from 5 to 25%, and in one planting to nearly 50%.

Downy mildew (Plasmopara viticola) was limited in its distribution, as observed during the 1943 season. Primary infections were observed in several plantings, but further development of the disease was prevented by the adverse weather conditions. Downy mildew was observed on a few leaves in one planting, late in the season.

SPECIAL CROPS

ARACHIS HYPOGAEA, PEANUT. Leaf spot (Cercospora arachidicola and Cercospora personata) was found in most of the plantings scattered throughout the State. In plantings near Ozark, in the Arkansas River "bottom land" leaf spot infections were observed causing considerable defoliation. Both species of Cercospora were present in this area. Other plantings throughout the State showed fewer infections. The peanut crop was planted too late and had made little growth when dry weather set in and finally gave very low yields. Leaf spot failed to develop except in very favorable places and actually caused little injury over most of the State.

Specimens of peanuts with stems attacked by a pycnidial fungus were collected near Parkin. Culture studies revealed that the causal organism was Diplodia frumenti. Loss due to this fungus in the infected area was nearly 5%.

Specimens of peanuts infected by a root rotting fungus were collected in late July and early August. While microscopic and culture studies suggested that the infections were due to Rhizoctonia it is probable that Sclerotium rolfsii was the primary cause of this disease. Very little loss could be attributed to these infections. Specimens of dead peanut plants collected in the same field, late in the growing season, by Professor Young and sent to Dr. B. B. Higgins of the Georgia Experiment Station, were identified by the latter as southern blight.

GOSSYPIUM HIRSUTUM, COTTON. The outstanding features of the cotton disease situation were (1) delay in emergence and planting from early drouth; (2) serious losses in stands from floods, washing, wet-spots, and damping-off; (3) serious nematode injury in sandy soils; (4) less Fusarium wilt than usual, owing apparently to hot, dry weather. We have noted this in previous drouth years; (5) less angular leaf spot, anthracnose on bolls,

and other boll injury, owing to dry weather; (6) very serious injury from drouth and deficiency troubles. (V. H. Young).

Leaf spot (Alternaria sp.) was widespread and very prevalent during the past season in Arkansas. Leaves infected by this fungus were apparent in early August, suggesting that some loss may be attributed to this disease. Alternaria infections were primary in many instances and in several cases secondary in nature.

Leaf spot (Cercospora sp.) was extremely prevalent and widespread during the 1943 season. Moderate to severe defoliation occurred early in August. Cercospora leaf spot, as observed this season, may have caused some reduction in the yield of cotton; however, in most seasons defoliation due to Cercospora leaf spot occurs late and has very little, if any, effect on yield. According to Dr. Young late summer leaf spots in Arkansas are, regardless of the fungi present, only secondary to non-parasitic troubles, i.e., drought injury, potash deficiency, and probably other deficiencies in some cases, and would be of minor importance if adverse soil or weather conditions were not present.

Wilt (Fusarium oxysporum f. vasinfectum) (F. vasinfectum) was observed in 20 counties in Arkansas during the 1943 season. This is not to suggest that cotton wilt is limited to these counties in Arkansas, but merely means that plantings in these counties were observed and found to be infected with this disease. The infections varied from 1% to nearly 30% in the most severely attacked plantings.

Root rot (Phymatotrichum omnivorum) had previously been reported from a very limited area in Little River County. Root rot was observed on "black land" west and south of Foreman, Arkansas. The observed distribution during the past season included scattered specimens from Foreman southwest into southeastern Oklahoma. The degree of damage sustained in various plantings fluctuated from 2 to over 10% depending upon the location of the planting. The most severe infection was observed in the lowland southwest of Foreman.

Wilt (Verticillium albo-atrum) was observed in 5 plantings scattered through the State; always, however, associated with heavy alkaline soil. The loss due to Verticillium wilt was far less than from Fusarium wilt. The amount of loss fluctuated from a trace in one planting to nearly 3% in the most severely infected planting.

Angular leaf spot (Xanthomonas malvacearum) was observed in some degree in many of the plantings surveyed. In one or two plantings in southwestern Arkansas slight defoliation resulted from early infections. Although abundance of inoculum was present early in the season, late infections were difficult to find, owing to adverse weather conditions prevailing during most of the growing season.

Primary infections of bolls due to this bacterium were difficult to locate. Very few infected bolls were found.

Rootknot (Heterodera marioni) was observed causing some damage in north-east Arkansas. A loss of nearly 1% could be attributed to rootknot in 2 plantings near Newport.

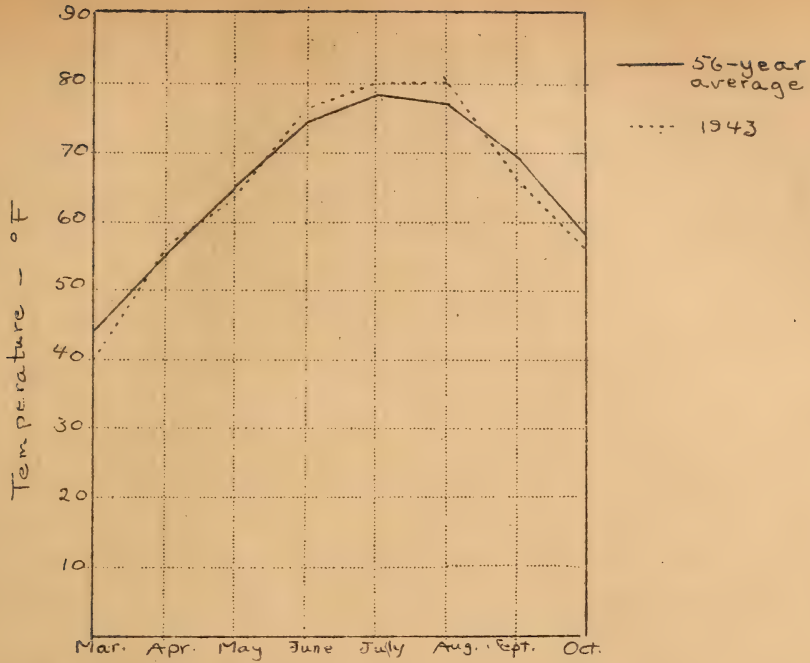
Rust (potassium deficiency). Cotton plants were observed in several plantings showing signs of potassium hunger during 1943.

SUMMARY OF PLANT DISEASES OBSERVED IN MISSOURI DURING 1943

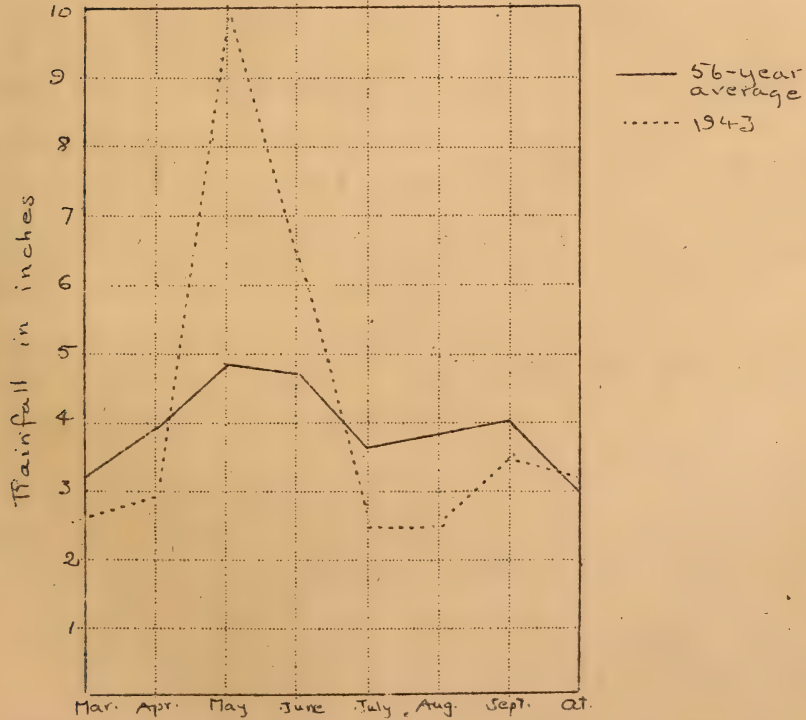
T. W. Bretz

The following summary of estimates on the plant disease losses in Missouri for the year 1943 is based on the rather limited observation of the writer, supplemented by the observations of Dr. C. M. Tucker, Department of Botany, W. R. Martin and J. W. C. Anderson, Extension Specialists in Horticulture, of the University of Missouri, and Ivar Twilde of Jefferson City, Missouri, in charge of Barberry Eradication in this State. In general it has not been possible to report the trend of the plant disease situation during the growing season, nor the relative severity of the various diseases in the different sections of the State, owing to the late start of the Emergency Plant Disease Prevention Project and the limited time spent in the different areas.

The weather was unusual in several respects during the growing season. The severe temperatures and frequent frosts during March and April were, in general, very damaging to the fruit trees, except in the case of apples. The wettest May on record occurred in 1943. Rains began on May 6 and occurred almost daily until the 21st, after which intermittent showers fell at frequent intervals until the close of the month. Monthly amounts were generally heavy to excessive, particularly over a wide belt extending diagonally across the State from the southwestern corner to the east-central boundary. Corn and other cultivated crops suffered generally from too much moisture and lack of cultivation. In general all crops on bottom land along the larger streams where flood conditions prevailed were severely damaged. June was warm and wet over much of the State, further delaying the planting and cultivation of crops. High water in the major streams prevailed throughout most of the month and lowlands remained inundated in most sections. The last week in June afforded the first opportunity to get into fields since the last week of May. During July, precipitation was deficient in the southeastern and southwestern divisions of the State and drought conditions prevailed during the latter half of the month, particularly in the southwest. August was, in general, hot and dry, with severe drought prevailing in the southern and southwestern sections. Except in some south-central areas where severe drought continued, conditions of the preceding months were generally relieved during September and there was some recovery of crops from the effects of the dry spell. Subnormal temperatures prevailed generally throughout September. The growing season ended at about the average date for the northern and central sections of the State, but about one to two weeks earlier than the average in the southern sections, with killing frosts and freezing temperatures about the middle of October.



Missouri - State Average Temperature



Missouri - State Average Rainfall

VEGETABLE CROPS

ALLIUM CEPA, ONION. This is not a crop of commercial importance in the State and its culture is almost wholly confined to home gardens. Botrytis allii (neck rot) appeared to be the only disease of importance and was estimated to have been responsible for only a trace of damage.

CUCUMIS SATIVUS, CUCUMBER. The culture of cucumber is for the most part limited to the home garden, although there is limited production under glass in the Kansas City area and in truck gardens in this area and near St. Louis. Erwinia tracheiphila, bacterial wilt, was undoubtedly the most important disease encountered and probably accounted for a 20% reduction in yield. Mosaic (virus) was considered to be of minor importance and responsible for a trace of damage.

LYCOPERSICON ESCULENTUM, TOMATO. Tomatoes are grown on a commercial scale in various sections of the State, both in the field and under glass. Field grown tomatoes were adversely affected by the weather in the southwestern area where the extended drought and diseases caused a probable 60% reduction in yield. In the northern counties, the frequent precipitation throughout the growing season accounted for a general increase of fruit rots and Septoria blight as compared with their prevalence in the average season.

Alternaria solani, early blight, was observed affecting the foliage in a number of plantings, but the stem lesions were noticeably less common than in some years. Damage from this disease was considered minor, amounting to no more than a trace.

Colletotrichum phomoides, anthracnose, did not appear to be a serious problem except in a few isolated instances late in the growing season. For the State as a whole, a trace of damage could be attributed to this disease.

Corynebacterium michiganense, bacterial canker, was observed in only a few instances on southern-grown stock and, in general, was considered to be of minor importance, causing a trace of damage.

Fusarium oxysporum f. lycopersici (F. bulbigenum var. lycopersici), wilt, continues to be an important problem, particularly where wilt-susceptible varieties are grown for commercial processing. It was estimated that a 50% loss resulted from wilt infection.

Septoria lycopersici, Septoria blight, was prevalent and serious in all sections of the State, causing much defoliation by mid-summer. The yield of the early pickings was probably not greatly reduced, except in that much of the fruit set was lost as a result of severe sunscald. Subsequent pickings were noticeably short, however, and of inferior quality. It was estimated that 15% of the crop was lost because of this disease.

Xanthomonas (Phytomonas) vesicatoria, bacterial spot, was prevalent in practically all fields, ranging from a trace to as much as 25% of the fruit affected. It was decidedly more prevalent in the northern, more moist counties. The bacterial lesions themselves do not seriously affect fruit used for processing, but undoubtedly they provide avenues of entrance for secondary, rot-producing organisms. A probable loss of 3% was estimated to have resulted from this disease.

Heterodora marioni, rootknot, was of importance in local situations,

particularly in the southern section, and it appeared occasionally in northern counties on southern grown planting stock. For the entire State, the damage resulting was considered to be of minor importance, amounting to a trace.

Fruit rots caused by various secondary organisms following sunscald, growth cracks, insect injuries, etc. were responsible for much loss throughout the season in all sections, accounting for an estimated 15% reduction in yield.

Mosaic (virus) was observed in a few instances but in no case was it a serious problem. Probable damage amounted to a trace.

Greenhouse-grown tomatoes are subject to certain diseases which do not, ordinarily, become problems in the field.

Cladosporium fulvum, leaf mold, is undoubtedly the most serious problem encountered in the culture of tomatoes under glass. It was estimated that this disease accounted for a 15% reduction in yield.

Despite a somewhat better opportunity to control Fusarium wilt under greenhouse conditions than is possible in the field, it was estimated to have caused a loss of 5% in the greenhouse tomato yield.

Phytophthora parasitica, buckeye rot, is of considerable importance as a factor in tomato production under glass. It was estimated to have caused a 4% loss.

Sclerotium sclerotiorum, drop, becomes of major importance in certain houses from time to time and may seriously affect production. On the average, however, the probable loss amounted to no more than 1% this past season.

Blossom-end rot, (physiogenic), is not uncommon in greenhouse tomato plantings and it was estimated to have caused a 2% reduction in yield.

PHASEOLUS VULGARIS, BEAN. The production of green snap beans is limited almost entirely to the home garden, although more extensive production occurs to some extent in truck gardens near the metropolitan centers.

Fusarium solani f. phaseoli (F. martii var. phaseoli), dry root rot, was observed but considered to be of minor importance, causing a trace of damage. Xanthomonas (Phytophthora) phaseoli, bacterial blight, was unquestionably the most serious disease problem on this crop, reducing the yield an estimated 20%. Uromyces phaseoli var. typica, rust, was of minor importance, responsible for only a trace of damage. Heterodora marioni, rootknot, was important in localized situations in reducing yield, but for the entire State, was considered to have reduced the yield only a trace. Mosaic (virus) was observed but considered to be of little importance, causing a trace of damage.

SOLANUM TUBEROSUM, POTATO. The most important commercial potato producing area in the State is located near Kansas City on low-lands, which were inundated during the spring floods. It was estimated that fully 50% of the crop was lost, either in the field or indirectly because of tuber decay in transit, as a result of the standing water. The loss due to other factors was of minor importance.

Actinomyces scabies, scab, was considered to be of little importance, accounting for a trace of damage. Erwinia phytophthora (E. carotovora), blackleg, was estimated to have caused a 1.0% loss, as was Fusarium solani f. eumartii (Fusarium wilt). Rhizoctonia solani, black scurf, was estimated to have caused a trace of damage.

CEREALS AND FORAGE CROPS

AVENA SATIVA, OATS. Erysiphe graminis, powdery mildew, was considered to be of minor importance and responsible for a trace of damage. Fusarium sp. and Pythium spp., caused root necrosis, a serious and prevalent trouble resulting in an estimated 5% reduction in yield. Puccinia coronata, crown rust, was prevalent in all fields but according to the State Barberry Eradication Office, was of minor importance as a factor in reducing yield. A trace of damage was attributed to it. Puccinia graminis, stem rust, was quite prevalent and in some instances severe damage resulted. The State Barberry Eradication Office reported an estimated reduction in yield of 0.5% for the State. Ustilago avenae (loose smut) and U. kolleri (U. levis) (covered smut) caused a combined loss estimated at 7% of the yield.

HORDEUM VULGARE, BARLEY. Erysiphe graminis, powdery mildew, was of minor importance and caused only a trace of damage. Gibberella zeae (G. saubinetii), scab, was prevalent and caused an estimated 2% reduction in yield. Helminthosporium sp., Fusarium sp., and Ophiobolus graminis were associated with foot rot, which was of minor importance and was estimated to have caused a trace of damage.

Helminthosporium gramineum, stripe, was responsible for a loss amounting to a trace. Helminthosporium sativum, spot blotch, was somewhat more prevalent and serious than in average years, causing an estimated 5% reduction in yield.

Puccinia anomala, leaf rust, was prevalent in all sections of the State, but only a trace of damage was thought to have resulted from the disease, according to the State Barberry Eradication Office. Puccinia graminis, stem rust, was observed in only a small percentage of fields and was considered to be of no importance in reducing the yield. No loss was reported by the State Barberry Eradication Office.

Pythium spp., root necrosis, was a serious problem and was responsible for an estimated 10% reduction in yield.

Rhynchosporium secalis, leaf scald, was of minor importance and caused a trace of damage.

Ustilago jenssenii (U. hordei), covered smut, was responsible for an estimated 5% loss. Ustilago nuda and U. intermedia, loose smuts, were estimated to have caused a combined loss amounting to 3%.

MEDICAGO SATIVA, ALFALFA. Pseudopeziza medicaginis (leaf spot) and Pyrenopeziza medicaginis (yellow leaf blotch) are probably the most destructive diseases of alfalfa in this region. They were severe on the first cutting and it was estimated that the yield was reduced 5%.

Rhizoctonia crocorum, violet root rot, was reported to be causing some damage in localized areas, specimens having been sent in to the University from Washington county.

"Crown rot" due to decay following insect damage was observed in the northwestern part of the State, affecting 3 to 5% of the stand in certain fields. It appeared to be a problem only in relatively old stands. The trouble was diagnosed by the Emergency Plant Disease Prevention Laboratory at Stillwater, Oklahoma, as secondary decay following injury by the clover root curculio, Sitona hispidula.

SECALE CEREALE, RYE. Practically all of the rye planted in the State is used as a fall and winter pasture crop and is plowed under in the spring. The diseases which occur are, therefore, considered to be of minor importance, except those influencing stand or affect leaf development.

Claviceps purpurea, ergot, was present to a very limited extent and caused an estimated loss amounting to a trace. Puccinia rubigo-vera var. secalis (P. dispersa), leaf rust, was considered to be of minor importance, causing a trace of damage. Pythium spp., root necrosis, was the most serious disease problem, causing an estimated 7% loss. Ustilago sp. caused a probable trace of damage.

SOJA MAX, SOYBEAN. A number of diseases were observed on soybeans. Except in individual fields, none of the diseases was considered to be particularly destructive and there seemed to be no apparent differences in their prevalence in the various sections of the State.

Diaporthe sojae, pod and stem blight, was observed in approximately 1/5 of the fields examined. In no instance was it destructive and it was estimated to have been responsible for only a trace of damage.

Peronospora manshurica, downy mildew, was observed in about half of the fields late in the growing season. Since the disease apparently did not become established until the plants were quite fully developed and the lesions were in the early stages of development, probably no more than a trace of damage resulted from the infections.

Pseudomonas (Phytomonas) glycinea (bacterial blight) and Xanthomonas (Phytomonas) phaseoli var. sojense (bacterial pustule), were present in practically every field, but in varying amounts. Infection ranged from instances in which only a few of the lower leaves were involved to situations where 100% of the foliage showed the presence of lesions. In no case were these diseases considered to be responsible for a great deal of damage, in that the total leaf area involved was rather small. It was estimated that the probable reduction in yield amounted to about 3%.

Macrophomina phaseoli [? sclerotial stage], charcoal rot, was observed affecting plants in only one field in southeastern Missouri, accounting for a 3 to 5% kill. For the State, the damage would amount to no more than a trace.

Bud blight (virus ?) was prevalent in approximately 2/3 of the fields examined. Its extent varied from field to field. In many, only a few scattered plants showed the characteristic symptoms; in others, practically all plants showed evidence of infection. In only a limited number of fields was infection severe enough to have caused an appreciable reduction in yield and it was estimated that for the State, no more than a 1% loss could be attributed to the disease.

TRITICUM AESTIVUM, WHEAT. Gibberella zeae (G. saubinetii), scab, was prevalent and caused an estimated 2% loss.

Puccinia graminis, stem rust, varied in prevalence depending upon locality and the variety of wheat grown, but in general it was not a serious problem. It was estimated to have caused a trace of damage for the entire State, according to the State Barberry Eradication Office.

Puccinia rubigo-vera var. tritici (P. triticina), leaf rust, was prevalent in all localities, but the losses resulting were considered to be negligible, according to the State Barberry Eradication Office. A trace of damage was reported.

Pythium spp., root necrosis, was one of the most serious disease problems, accounting for an estimated 10% reduction in yield.

Septoria tritici, speckled leaf blotch was of minor importance, causing a trace of damage.

Tilletia foetida (T. laevis) and T. caries (T. tritici), bunt, caused an estimated 1% loss.

Ustilago tritici, loose smut, was of considerable importance, causing an estimated 6% reduction in yield.

Xanthomonas (Phytomonas) translucens var. undulosa, black chaff, was of minor importance, causing a trace of damage.

ZEA MAYS, FIELD CORN. Bottom-land corn was subject to frequent and prolonged inundation during the spring rains in much of the State and as a result got off to a very late start. Many fields were replanted and some plantings were made as late as the latter part of June and early July. Bacterial stalk rot (Phytomonas dissolvens) was a problem locally in these excessively moist situations and much of this late planted corn was killed by the October freezes before it had fully matured. In the southwestern section, the severe July and August drought stopped the development of the plants, precluding the possibility of a profitable yield.

Aspergillus spp., ear rot, was relatively common following corn ear-worm damage, but probably caused only a trace of damage.

Diplodia zeae, dry rot, was prevalent in all fields except some very late planted ones in which the plants were still green and immature in late October. The stalk rot phase of the disease varied in prevalence from an average of 11% infection in the southwestern, drought-affected counties to an average of 33% infection in the northern section where more normal precipitation occurred. Only 2% reduction in yield was estimated since most of the plants apparently became infected relatively late and had produced reasonably good ears. The ear rot phase varied little in the different parts of the State and was estimated to have caused a 1% loss.

Fusarium moniliforme, ear rot, was prevalent in all regions, particularly following ear worm damage. Although the percentage of ears infected was fairly high in some fields, the actual loss was estimated to have amounted to 0.5%.

Gibberella zeae (G. saubinetii), ear rot, was likewise prevalent over the State, varying considerably from field to field. The average loss probably amounted to about 0.5%.

Nigrospora oryzae, ear rot. This organism was very prevalent and was found affecting a very high percentage of secondary ears. Since these ears normally do not develop, this infection may be discounted in estimating the loss due to Nigrospora. The percentage of primary ears affected averaged less than 0.5% and it was estimated that the actual damage resulting amounted to a trace.

Penicillium spp., ear rot, was common following ear worm damage. The loss, however, was estimated to be no more than a trace.

Phytomonas dissolvens, bacterial stalk rot, was important in localized situations on flooded bottom-lands. No more than a trace of damage was noted by the writer, although reports were received at the University indicating that in a few fields a relatively high percentage of plants was affected.

Bacterium (Phytomonas) stewartii, bacterial wilt, was observed but considered to be of minor importance, accounting for a trace of damage.